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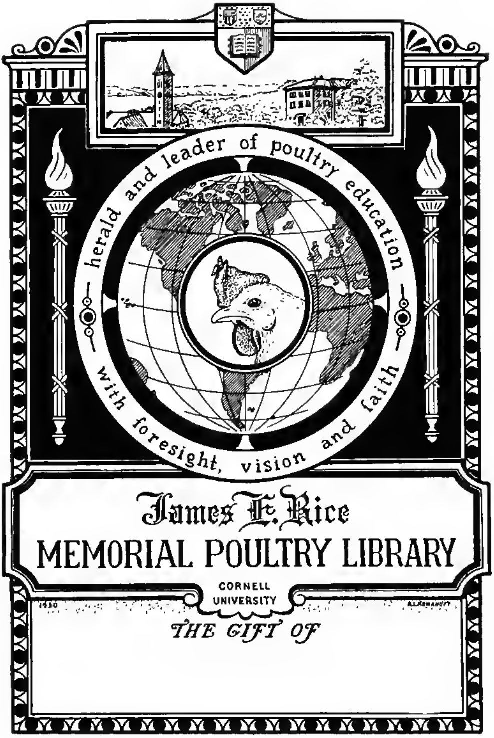
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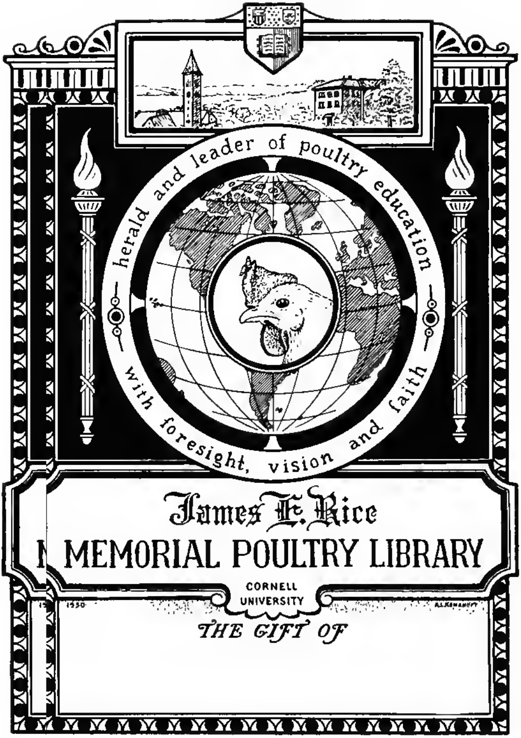
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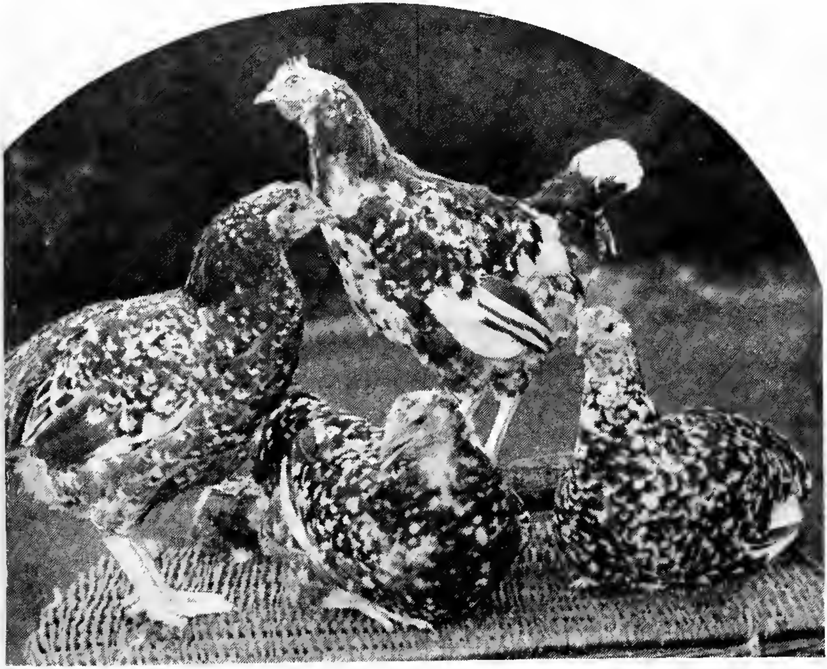

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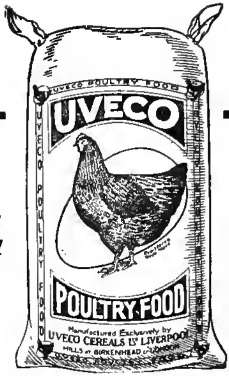
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PREFACE

POULTRY-KEEPING is a cosmopolitan industry. It can be carried on upon a general farm, upon a poultry farm, in a paddock, in a garden or in a backyard, in both town and country. Similarly, there are all sorts and conditions of poultry-keepers, but by far the largest class is what we might describe as the suburban amateur, who keeps a few fowls in his garden or backyard, sometimes solely to produce eggs for his own table, but more often to make what profit he can out of them. For let it be understood that poultry-keeping is not a hobby, but a business—the one particular branch of the agricultural industry that can be carried on just as successfully in a garden run as on a large farm.

It seemed fitting, therefore, that this, the largest class of poultry-keepers in the country, should have a book written specially for their benefit by one who, after many years' experience in keeping poultry on a farm, a poultry farm and a fancier's breeding establishment, has now settled down as a suburban amateur, and finds much pleasure and an even higher rate of profit in proportion than he was wont to earn when operating on a larger scale. For there can be no doubt that the average back-garden amateur who goes the right way to work can produce eggs more economically, and therefore more profitably, than any other class of poultry-keeper. He has no rent to charge to his fowls, there is no bill for labour ; he can devote attention to a limited number of birds, and maintain a higher standard of condition and productivity than if he had some hundreds to look after ; and he can keep the costs down by making use of house scraps and other waste food which the large breeder would not consider it worth his while to bother about.

We have always had back-garden and backyard poultry-keepers, but the Great War revealed the economic importance of this class, and no other poultry-keepers rendered more valuable service at a time when food-stuffs were scarce and it was practically a case of producing wholesome eggs out of mere rubbish, which surely deserves to rank with the historical feat of making bricks without straw. Moreover, it is significant that although many branches of food-production were stimulated into activity by the stringent conditions of 1914-18, poultry-keeping is practically the only branch that did not suffer a slump when peace-time conditions were restored, but continued to gain adherents, to develop its resources and to improve its methods. For the modern poultry-keeper is a progressive being ; if he is doing well he wants to do still better, and so we go on searching for and discovering new systems that help us a step or two along the road to efficiency.

In these days the egg and poultry crop of Great Britain is worth upwards of £60,000,000 per annum, which is double the annual value of the wheat crop. It is capable of further expansion, for we still import several million pounds worth of foreign eggs every year, and there is plenty of scope to increase the consumption of eggs so long as prices remain reasonable. The poultry-keeper must secure such prices for his produce as will reward his enterprise ; but high values, such as prevailed during the war, are against his interests, for they limit consumption and restrict business.

The suburban amateur plays an important part in the regulation of egg values, for though the produce of one householder may be insignificant, the produce of several millions becomes a dominant factor that not even the large poultry-farmers can contend against. And since the amateur can produce eggs more economically than anyone else, and therefore sell them cheaper than anyone else, it follows that he is not only going to control the markets and keep prices within reach of the multitude, but at the same time he is going to make better profits than any other class of poultry-keepers.

With such excellent business prospects we are confident, therefore, of a continual accession to the ranks of suburban amateurs, and we are setting out to tell them first of all the fundamental facts, and then something of the detailed management that will enable them to keep their small flocks with the maximum pleasure and profit.

SUBURBAN POULTRY-KEEPING

CHAPTER I

HOW AND WHERE TO KEEP FOWLS

THE economical production of food has become a matter of great importance to the British people, and no class of the community has taken a keener interest in producing wholesome foodstuffs at home than those whose opportunities are necessarily limited by the circumstances of their surroundings. The average small garden in town and suburbs does not give much scope for vegetable culture, but it does offer very favourable chances of keeping a few hens, so that without any exaggeration it may be stated that poultry yield the most generous return in wholesome food for the space covered and for the labour entailed.

Until recent years poultry-keeping cannot be said to have enjoyed a very creditable reputation, and even now in some districts it is difficult to live down unfavourable impressions based upon the experience of what we may call the dark ages, so far as poultry are concerned. The early poultry-keepers of thirty or forty years ago consisted of a few specialists and a vast number who knew neither system nor method, and seemed to act upon the belief that the worst of everything was good enough for a hen. In such hands poultry were wasted. Productive possibilities were ignored, and no one appeared to realize the influence of management. To the average amateur all hens were alike, and no one seemed anxious to learn anything beyond the most crude and elementary facts.

The position is greatly changed to-day, however; and in setting out to tell the public how they can keep a few fowls economically, profitably and pleasurably in a very limited space we must first of all impress the fact that the average hen is what her owner makes her. Egg production is not an automatic function. It is influenced mainly by management, and under the heading of management we include, first, breeding; second, housing; third, feeding; and fourth, attention to detail.

Principles of Breeding

We want to interest every beginner in the subject of breeding, because, even though he may not have the space and convenience to go in for breeding his own stock, except on a very small scale, some elementary knowledge of the simple principles of breeding poultry for useful character is absolutely essential to his success. Probably he will start out with the idea that all hens are alike, or that variation in productive character is purely a matter of chance. Nothing of the kind. Productiveness is an inherited character, and the only way to get good layers is to breed for them. Enormous progress has been made in this direction during the last twenty years, and a great deal of it is due to the stimulus provided by laying competitions. One effect of these is to bring into being a class of poultry-keepers whom we call specialist utility breeders. Their business in life is to cultivate the productive character, and it is to them we are largely indebted for what are generally known as bred-to-lay or pedigree laying strains.

The methods of these breeders may vary in detail, but they are all imbued with the purpose of increasing production, within reason, and of eliminating the lazy, unproductive class of fowl. We say " within reason," for the laying competitions are not intended to encourage the breeding of hens that lay an abnormal number of small eggs, or birds that might exhaust their energies in one season's laying. The purpose of these laying contests is not sporting, but commercial ; hence we find that small eggs are penalized, and breeders are encouraged to strive for a strain of fowls that will yield a high average production of good marketable eggs, and at the same time retain full vigour for breeding purposes. Considering that we are still in the early days of breeding for productive character, it is not surprising to find that errors of judgment are sometimes made by taking risks in mating stock which, while possibly leading to more eggs, often result in smaller eggs and weakly chickens. Later on, however, we shall give some simple hints on safe breeding methods, which will show the beginner how such risks can be avoided.

Pure Breeds Preferred

For the present we want to convince him that if he is going to keep fowls at all it will pay him to have birds that have been bred to lay, and not the old-fashioned barndoor type of fowl that just happens into the world without anyone caring whether her progenitors were useful creatures or mere drones. There may be good layers among the barndoor flocks, but their usefulness is due to accident rather than to design, and for one useful layer there may be half a dozen that will not yield enough eggs to pay for their keep. There is altogether too much chance and uncertainty in keeping mongrel hens, and the odds are too heavy against the poultry-keeper ; whereas if he stocks his run with pullets from strains that have been bred to lay, which naturally will cost him more than the common, uncultured class, and if he manages them with reasonable care and intelligence, he is practically certain to get good results.

During the War the writer started a suburban resident with a small flock of poultry consisting of eight White Leghorn hens, which were accommodated in a house and run of a type which will be described later, and fed and managed by a lady who had had no previous experience. Those eight pullets laid 1,616 eggs within twelve months, an average of 202 eggs from each bird, and the value of the eggs covered the cost of feeding, the original cost of the eight birds, and more than half the cost of the house and run. That experience was by no means exceptional, and can be equalled and excelled by anyone who goes in for keeping a few fowls on the right lines.

Accommodation

And now, having shown the reader that there is something in poultry-keeping to hold the interest of the business man, the student, the conscientious worker, and the thrifty housekeeper, let us go on to consider the question that will occur first to all who are contemplating going in for poultry. Where can we keep the fowls, and how must we keep them ? We venture to say that there are not many back-gardens or backyards in town or country that could not be used to accommodate a few laying hens under one or other of the systems now in vogue. We have already alluded to the fact that poultry-keeping earned some discredit in the old days through the loose methods adopted and the ramshackle buildings in which the birds were kept. Landlords and health authorities took a dislike to poultry-keeping, not without reason; and it is unfortunate that although housing and other methods have greatly improved, there is still a tendency to discourage poultry-keeping in urban areas, under the impression that it must of necessity be a public nuisance.

Local Regulations

The legal position in regard to poultry-keeping in towns is still somewhat vague, but the Ministry of Health has laid it down that local authorities have no power to draft by-laws repressing poultry-keeping in urban areas. They have the power to take action against any householder who permits his fowls to become a public nuisance, either through smell or noise, and it is competent for any authority to bring an action against a poultry-keeper whose birds offend in that way. Landlords may also insert clauses in letting agreements or leases prohibiting the keeping of poultry, so that it is just as well when making a start to be sure that your lease or tenancy is not hedged about with any such restriction. But provided there is no written and signed agreement to curtail your liberty as a poultry-keeper, neither a landlord nor a local authority has power to compel you to cease keeping poultry, unless a successful action is taken against you on public grounds.

The objections to poultry-keeping in urban districts are mostly based upon misapprehension as to the conditions under which fowls can be kept. The older generation have distinct recollections of ramshackle buildings, dirty fowls, and smelly runs; and they think, with good reason, that such things ought not to be allowed in these days. We are cordially in agreement with them in that respect, and we can only regret that up to the present many of them are still unaware that the unsavoury conditions they have been accustomed to see do not represent the correct methods of keeping fowls, but that they are so far removed from poultry-keeping proper that we regretfully have to regard them as a disgrace to the poultry industry.

The purpose of this book is to show everyone, however limited his space, how he can keep fowls with pleasure and profit under conditions that are perfectly sanitary and do not in any sense constitute an eyesore or a public nuisance. The well-conducted poultry-run can be made an ornament in the garden—or, at any rate, it should not be unsightly—while the birds themselves can be kept in the smallest space, and in such condition, during the greater part of the year, that one may justly be proud to show them to one's friends.

Intensive Poultry-Keeping

The methods that are most likely to prove satisfactory to the small poultry-keeper with limited space, are those commonly known as intensive and semi-intensive. Intensive poultry-keeping means perpetual confinement in a covered run or scratching-shed, whereas the semi-intensive method entails the use of an intensive house or scratching-shed, with an open run of varying size for the birds to make use of when they feel inclined. We have no hesitation in saying that we prefer the semi-intensive system because it is easier to keep hens fit when they have a run out on the grass, or even on a bare earth run, every day, more particularly in summer ; but it is mainly a matter of space and convenience, and if we had not room enough to give our hens a run out every day we should not hesitate to keep them on the strict intensive system—ministering to their wants and making their lives as active and as healthful as possible in the circumstances.

When we write of a semi-intensive system we are not referring to the old-fashioned method of keeping fowls with a roosting-house and a small run, and we want to warn readers against making so serious a mistake. The old-fashioned backyard hen-house was a mere roosting place, just large enough to provide perching space, but with no room for exercising. Adjoining this was a small uncovered run—a bed of mud in winter and a heap of foul dust in summer—in which the birds led an inactive, and one fears a miserable, existence. They might scratch about among the dust in summer, but in winter they had no chance whatever, and winter laying was practically unheard of among hens kept in this way.

Exercise in Confinement

The advantage of the modern intensive system is that, where space is very limited, it enables it to be made use of to provide exercising ground. Supposing, for instance, we could spare only a small corner of ground measuring 10 ft. by 4 ft. The old-fashioned backyarder would have put up a small roosting house, measuring about 3 ft. 6 in. by 4 ft., and he would have fenced in the remaining 6 ft. 6 in. by 4 ft., as an open run, which would have been practically useless because in winter it would have given the birds no facilities for exercising. But by the modern intensive method, we should cover in the whole space, 10 ft. by 4 ft., and by fixing the roosting perches fairly high up at the back, with a platform beneath to catch the droppings, as we shall presently show, we should have practically 40 square feet of floor space for exercising the birds. The only exercise possible for fowls in close confinement is scratching; and it is by spreading dry litter on the floor, and scattering food among it to keep the birds busy, that we are able to maintain a flock of hens in very good condition—in many cases quite equal to those which have facilities for natural exercise in the fields.

Choice of Housing Systems

In winter the strict intensive system—that is, constant confinement—is the most favourable method of accommodating hens for egg production; but in summer the semi-intensive system—with the open run as an adjunct to the intensive house—is preferable because the open conditions are more suitable at that time of year, though if we are compelled to keep the birds closely confined we make matters better for them by throwing open the front of the house, hanging shutters for shade, and making the place as light and airy as possible. So let this rule be borne in mind. If the space available is very small, let it all be covered over and let the plan of accommodation be strict intensive; but if there is plenty of ground suitable for a grass run or a roomy earth run, let the system be semi-intensive, though the scratching quarters under cover will be just as essential, because in winter the hens would have no other means of taking exercise. Therefore it amounts to this: Your fowls need a roomy scratching-shed or intensive house as winter quarters, and if you can give them a nice open run for exercise in summer so much the better for them and for you; but if not, you must make the winter quarters serve your purpose in summer by adapting them to suit the climatic conditions.

Garden Poultry-Runs

A plan that may appeal to many readers is to make a portion of the garden serve for a run in spring, summer and autumn, provided the ground can be spared. When that is done a double purpose is served, for it benefits the fowls, and they in turn enrich the soil. An old poultry run always makes a rich bit of garden, and you never find wireworms in it, and even if you run a few hens on a plot for six months they will give it a good dressing of manure. In practising this plan we do not trouble about the outer run during the winter months, from November to March, but then we put up a fence of wire netting and covered hurdles round the bit of garden ground we can spare, and the birds are let out every day. If there are any fruit trees on the ground so much the better for the sake of shade; but in any case we like to plant a few kale on the ground intended to be occupied by the fowls, as this will provide green food for the birds to peck at. The run is occupied until the following November, or until the weather gets so bad that the hens can have no use for an open run, and do much better for themselves in the covered scratching-pen. Then the fence is removed and the ground is dug up for growing a crop during the following season, when another bit of the garden will be fenced in for the poultry.

To carry out this plan one can either have a movable scratching-shed house, or a permanent structure can be put up in a central position in the garden so that the ground all round it can be fenced in for a run in turn. Incidentally we would add that such crops as onions, and any of the Brassica (Cabbage) family do well in the first year after fowls have been running on the ground, and in the following season potatoes will do as well as anything. For three or four years the ground will show traces of the rich manuring it has had during the few months the fowls were running upon it.

Essential Conditions of Intensive Housing

An intensive or semi-intensive house can be made in any size or design to suit the circumstances, so long as the essential features are observed. It must be borne in mind that the hens have to be confined to the house all the year round, or at any rate all through the winter; consequently we must have plenty of floor space for them to scratch upon, plenty of light to enable them to see in every corner, and an abundance of air so that they do not become pampered in an artificial atmosphere. Space, light and air are the first things to be borne in mind in designing a scratching shed or intensive house; and in regard to the space it is generally reckoned that four square feet of scratching floor space should be allowed for each bird. Some authorities say you should allow three square feet for light breeds and four or five square feet for heavy breeds ; but, as a matter of fact, there is little or no difference between them when it comes to scratching, and a Leghorn wants just as much room as a Wyandotte. Four square feet per bird is the minimum allowance, in our opinion, and for strict intensive work—that is, where birds have to be permanently confined to the house all the year round—we prefer to allow five square feet per bird, while for semi-intensive work, where a good outer run is available for fine weather, a little less than four square feet per bird might be practicable.

At any rate, when measuring floor space in this connection you must count only that which is actually available for scratching. In the modern intensive or semi-intensive house everything is arranged so as to conserve floor space. Nest boxes are built outside, or else they are fixed to the wall a couple of feet or more above the floor, while water-fountains, grit-boxes, food-troughs, etc., are similarly fastened to the walls within reach of the birds so that they do not cover any of the precious floor space. As for the perching accommodation, a great saving is effected by fixing a platform or droppings board just beneath the perches. This droppings board should be about 2 ft. to 2 ft. 6 in. above the floor, so that there is plenty of head room underneath it. All the excrement from the birds during the night is therefore deposited upon the board, and can be scraped off every morning to ensure perfect cleanliness ; while the litter on the floor is preserved from contamination, and valuable space is conserved by providing upstairs sleeping quarters and a ground floor solely devoted to scratching exercise.

Warm Houses not Required

The old-time idea for a combination house and scratching-shed was to partition off a portion of the building specially for a roosting place, and to keep the remainder solely for a covered shed or exercising-ground. Some people still cling to that idea, probably under the impression that hens need to be shut up in a small roosting-place at night to keep them warm, which is not the case. Do not on any account set out with the idea that hens require hot-house treatment, or that you can make them lay in winter by shutting them up in a warm, stuffy place. You will only make them delicate and susceptible to colds, and you will not get the eggs you want.

The best proof of the truth of this assertion can be found on any up-to-date poultry farm, or in any laying competition, where splendid winter results are obtained. Laying competitions have become a popular feature in recent years ; and one of the lessons they have taught is that you cannot get winter eggs by coddling your hens. Many of these competitions are held on exposed sites, and the houses are invariably of the open-fronted type, with adjustable shutters that are never quite closed, but always ensure a cool temperature and a pure atmosphere. Hens need to be protected from draughts, but their feathers provide such effective protection from cold that there should never be any question about letting them sleep in a cool atmosphere.

Therefore the partitioned-off roosting compartment is unnecessary, and it is uneconomical because it means that a certain amount of floor space is wasted that might be devoted to the purpose of scratching. Supposing, for example, the only bit of ground available and suitable measured 10 ft. by 4 ft., as already quoted, and we partitioned, say, 3 ft. off at one end as a roosting chamber, leaving only 7 ft. by 4 ft. for a scratching floor. That would give us twenty-eight square feet, sufficient only for seven pullets ; whereas by doing away with the separate roost, fixing the perch at the back over the droppings board, and making use of the whole forty square feet of floor for scratching purposes, we should be able to accommodate ten pullets. In addition, there is a saving in building material, and the place is more easily managed and kept clean.

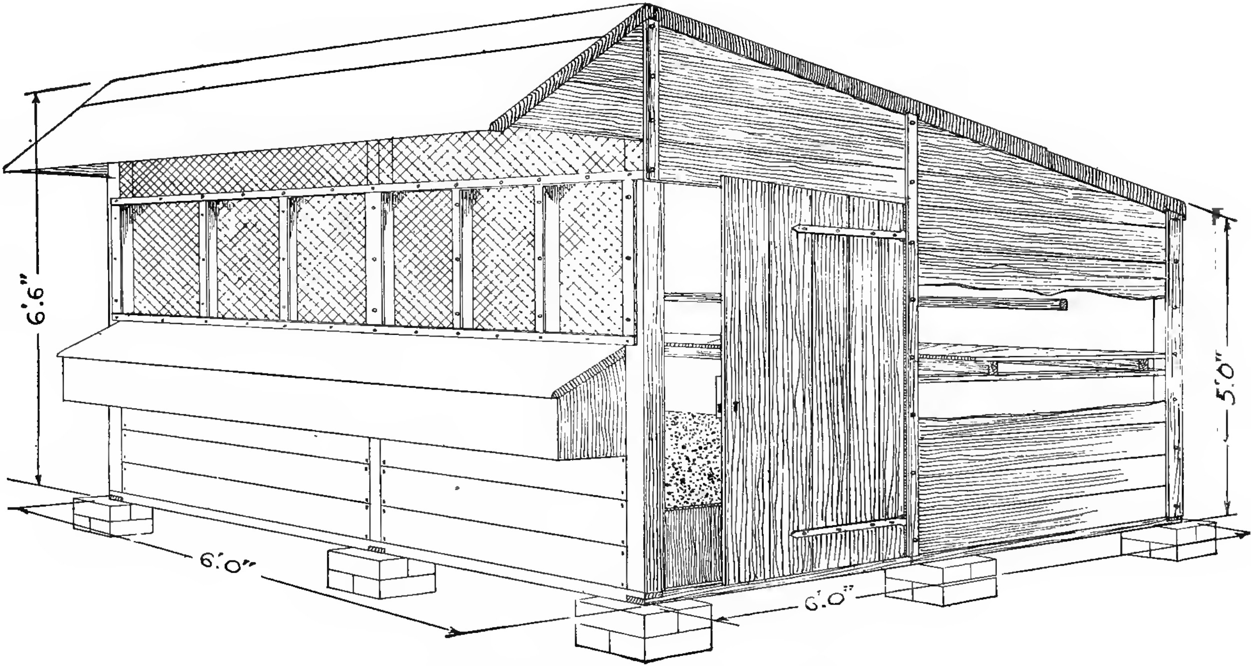
Aspect and Site

Before we proceed to give particulars of suitable houses, let us consider the question of the site. There are some cases where there is little or no choice in the matter, and the house has to be put in the only suitable position. A wall or building is useful to serve as the back of a lean-to structure, and there may be another wall or building that can be utilized for one end, which will mean a considerable saving of material. A southerly aspect is always preferable because it has a considerable advantage in winter, though there are drawbacks in a hot summer. A south-easterly aspect is the best of all because it gets the sun in winter, and there is little heavy rain from that quarter, while it is always possible to provide sufficient shade in summer. With a south-westerly or westerly aspect we must take precaution to prevent rain beating into the semi-open front, while any northerly aspect is disadvantageous in winter, though it may be preferable in summer. A building can be made to suit both seasons, by means of an interchangeable back and front, the semi-open and shuttered portion being set up on the south side in winter, while in summer it is moved round to the north side, the solid back wall being brought round to the south side in its place.

For the benefit of those who are handy with tools we are giving several designs of small intensive or semi-intensive houses that can easily be erected. Many poultry-keepers have built their own houses, but the old-fashioned ideas of knocking together a roost out of a packing case must be revised in order to provide the conditions that are essential to success. The materials of the packing case may still be utilized, but the design of the house must follow modern lines if we are to keep our hens under favourable conditions for egg production.

A Small-Flock House

The first house illustrated was recommended by the Ministry of Agriculture for a small flock of from six to nine hens, and its measurements are 6 ft. by 6 ft., and 6 ft. 9 in. high in front, and 5 ft. high at back. The sketch shows the house built upon bricks, but it may also be built upon a concrete floor. The corner posts are of 3 in. by 2 in. scantling, and the walls are of $\frac{3}{4}$ in. tongued and grooved matching. The design shows the nest boxes built outside in front, and above are panels permanently fitted with glass. These glass panels extend to 21 in. above the nest boxes, and above the panels there is about a couple of feet of wire netting, which is protected by a wide and deep weather-board that avoids draughts and prevents rain beating in. This arrangement would answer very well for the winter,



MINISTRY OF AGRICULTURE HOUSE.

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but it seems to us that the fixed glass panels in front would make the place very hot in summer ; and as an alternative we suggest that the nest boxes be built at the far end, opposite the door, and that the glass panels be made to slide up and down in grooves, suspended by light chains, so that they may be fixed in any position, as the state of the weather may necessitate.

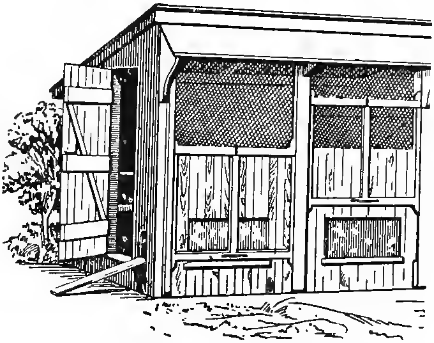
It will be observed from the sketch that a single perch is fixed at the back, with a droppings-board about 6 in. below. The roof is covered with felt, and the outside nest boxes should have a hinged front so that eggs can be so collected from outside without going into the house. Built on these lines the house should be quite light enough, but if it is in a very shaded position it may be necessary to let in two glass panels at the back underneath the droppings board, or one at each end, on the same level.

For a Larger Flock

A house of similar character, designed specially for the National Egg-Laying Test on the Great Eastern Railway Company's farm at Bentley, Suffolk, is illustrated. This house is 7 ft. long by 8 ft. deep (from back to front), and 6 ft. 6 in. high in the front. The wire-netting portion in the front is protected by glazed panels which slide up and down, and below are two windows to ensure good lighting. The nest boxes are fitted to the wall inside the house, and the perches (two in number) are at the back, over a droppings board. We have kept fifteen Leghorn hens in a house of this type with admirable results, and for semi-intensive purposes it is one of the best designs.

A Lean-to Scratching-shed

For those who wish to give their fowls a more extensive covered run, and at the same time to economize on the sleeping quarters, especially in a small garden where a lean-to structure can be built up against a wall or fence, the type of combined roost or scratching-shed, illustrated, will be found suitable. The whole building is 15 ft. long, 6 ft. wide, and 6 ft. high at the back. The roosting portion is partitioned off, and may be made to any size; though for this particular purpose we would suggest that only 4 ft. of the length need be enclosed, providing a roosting compartment 4 ft. by 6 ft. Two perches at the back of this compartment will provide ample room for a dozen hens to roost, and we shall then have a covered scratching run, measuring 11 ft. by 6 ft., or 66 square feet, which will



STANWORTH'S HOUSE.

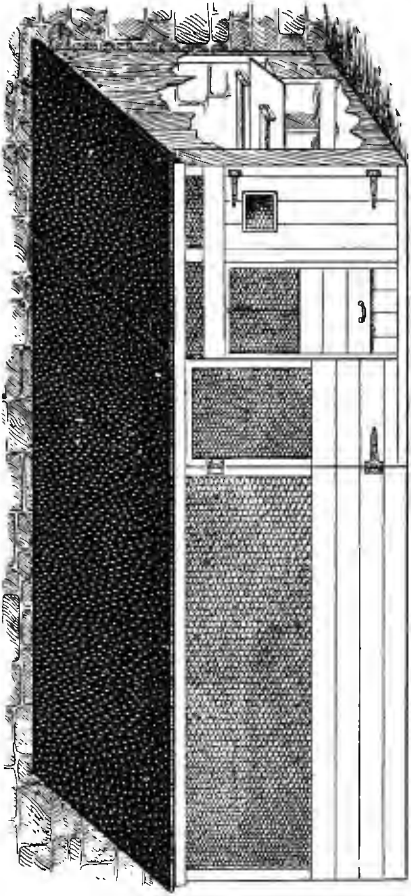
A WELL-DESIGNED SCRATCHING-SHED HOUSE.

(*Double Houses of this type are used in the National Laying Test at Bentley.*)

allow 5½ square feet per bird, provided we keep a dozen hens. In this case the nest boxes are shown under the droppings-board, but details of that kind are optional, and if preferred the nests may be affixed to the wall in the covered run. This is shown boarded up in front to about 2 ft. 6 in. high, with only wire-netting above ; but whether that is sufficient will depend upon the aspect and whether the place is at all exposed. If it is it may be necessary to have glass panels to slide up and down, and in any case it is advisable to let the roof project a foot or more over the front, to prevent rain beating in.

Scratching Space Essential

It is unnecessary to take up further space by illustrating various designs of houses which, after all, embrace the same features. But let us, before passing on to other subjects, remind the reader what he must look for and provide for in buying or building quarters for laying hens. It is not merely the night accommodation he must think about, but the day accommodation as well. His fowls require comparatively little room when they are asleep on the perches at night ; but during the day they need plenty of room to scratch about and keep fit, and they should have at least four square feet of scratching floor space per bird. These scratching quarters must be dry, and therefore covered in and protected from beating rain ; but they must also be airy, and so well lighted that the birds can see to scratch for their grain in any and every corner. In short, the aim should be to provide exercise ground so that the birds may keep as fit as they would if they were on free range ;



LEAN-TO SCRATCHING-SHED.

and that exercise ground must be covered and protected, otherwise there might be many days when it would be useless. This is the only method of housing hens that will yield good results in egg production, and though it will necessarily cost more than the old-fashioned roosting house and wire-netting enclosure, it will amply repay its cost by making it possible to produce eggs at such times as they could not be produced by the old-fashioned plan.

Preserving Woodwork

Let us now give a few hints for the care and preservation of poultry houses. Those who like ornamentation may paint their houses to any colour, but for practical purposes either tar or creosote preservative will answer the purpose for protecting the woodwork, and it will be much cheaper. Creosote preservative, which is sold by various names, such as Solignum, is the easiest to handle, and it gives a very good appearance ; but if tar is used it should be put into a bucket (not more than half full) and warmed up over a fire until it runs thinly. Tar is the best material for coating roofs, and this attention should be given once a year in order to keep the house weatherproof. For the interior of the house limewash has the effect of making the place lighter, but creosote has a more deadly effect upon insect pests, and an annual dressing of this material, running it well into all cracks, joints and corners, will keep a place in clean and fresh condition.

Floors

Of what to make the floor of a scratching-shed depends upon local circumstances. An earth floor is naturally the cheapest, and it can be kept clean if the top spit, say four inches, of soil is removed every year, and fresh soil put in its place. But in that case the floor of the scratching-shed must be some few inches above the surface of the ground all round, otherwise it will not be possible to keep litter dry all winter. A boarded floor is easy to keep clean and it makes work easier, but where rats are troublesome a concrete floor is best of all. To make this, first take out five or six inches of soil, fill this space up with stones, then, having mixed the concrete, lay it upon the stones and level it with the back of a spade. A serviceable concrete that will last for years can be made with one part cement to two parts sand or fine gravel. When rats gnaw through a wooden floor, and when it is impracticable to put down concrete, the best plan to keep the pests out is to obtain some 1 in. mesh wire netting, about 18 in. or 2 ft. wide ; sink a trench all round the house, nail the netting to the bottom of the house all round, let it hang into the trench, and then fill in the earth. When the rat begins to burrow he comes up against an impenetrable barrier.

Scratching-Litter

The littering of the scratching-shed floor is an important matter, for, as we have said, hens kept in close confinement can only get necessary exercise by scratching about among loose material, such as peat moss, straw, chaff, cavings, cedar shavings, dried leaves, bracken tops, etc., to mention some of the materials in general use. A barrow load of dry earth should also be added, especially on a board or concrete floor, and over this should be spread the lighter litter to the depth of 5 or 6 in., or even more in the case of straw and leaves, which are soon reduced in bulk. The idea is to promote exercise by scattering the grain among the litter, so that the more litter there is the more work the fowls have to do ; and it is this work which keeps them warm in winter, fit and healthy at all seasons, and prevents them becoming fat and lazy. A mere light covering of litter on the floor of the scratching shed is therefore of little use ; and it is false economy to try to save money by stinting scratching material.

Those who live in the country have opportunities of obtaining good litter that are denied the townsman. Bracken tops and dried leaves, especially those of beech and oak, are readily collected, while supplies of broken straw and cavings can be got for little or nothing when the farmers are thrashing. Then those who have grass runs can mow and dry the coarse grass in summer, and this will come in handy for litter or for lining the nest boxes. The town poultry-keeper may be able to get broken straw from packing cases, or if he has to purchase litter, the best of all is peat moss. This is more costly to buy, but it lasts much longer than any other, and is the best absorbent. By spreading peat moss on the scratching-shed floor to the depth of four or five inches, and adding three or four inches of broken straw, one produces an ideal litter that will last for six months or more if it is forked over occasionally. The best way to tell when litter wants renewing, however, is to note when it begins to cake and to give off an unpleasant odour. That will happen in two or three months with straw and leaves, but with an absorbent material like peat moss a much longer period of durability is assured.

Poultry Manure

Of course, the fouled litter makes splendid manure for the garden, and the owner of a dozen fowls will find that his manure bill for the crops is considerably lightened. Old litter may be stacked in a heap out-of-doors to rot down ; but fresh droppings from the roosting house should be stored under cover in barrels and boxes, in which case this manure will be a very powerful stimulant and should be used sparingly for all crops. Onions and leeks will stand the greatest amount, while all Brassica (Cabbage) crops will benefit, and potatoes too, if given a light top-dressing before they are hoed up.

Open v. Covered Runs

Where ground is available for an open run we do not lay down any rules as to the extent, because it is generally a matter of convenience, Where the whole space available for poultry, however, does not exceed a hundred square feet, we consider it is better to cover it all in, since it can be made better use of as a covered scratching-shed, and what little space would be available as an open run would be of no advantage to the birds. Besides, by covering over the whole space one could keep twenty hens, whereas if only half the space was covered in, and the remainder left for an open run, not more than ten hens could be accommodated. That is because we must always calculate our housing capacity by the extent of the covered scratching accommodation. No matter how extensive an open run be available, we must calculate our covered accommodation at the rate of four square feet per bird, for the open run is of little or no use in the winter, when egg production can only be maintained by keeping the birds active and healthy under cover, not necessarily coddled—for coddling does not enter into the scheme of winter egg production, and is, indeed, a thing to be avoided—but kept out of the wet, the mud and the cold winds, and given an opportunity to keep up their normal condition by taking exercise as they would if they were running out at liberty in the spring-time. In short, to make the conditions in winter as near as possible resembling those in spring is the chief secret of successful poultry-keeping, and this is one of the elementary facts we want to impress upon the beginner.

Draining Open Runs

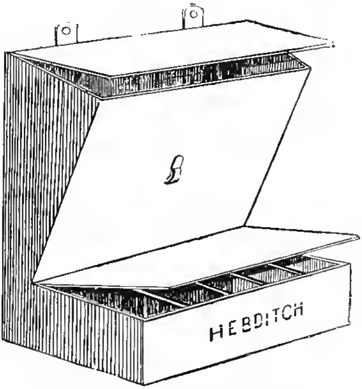
An open grass run is only useful, and indeed practicable, when the space is of considerable extent, for in a small run the original grass soon becomes worn away, and it does not recover while the hens are running upon it. Such a run is apt to degenerate into a mere mudbank in winter and a dust-heap in summer, consequently the best plan to keep it dry and clean is to put on first a layer of clinkers or coarse stones, with a surface of fine furnace ash or loose gravel, which will afford good drainage and ensure a dry surface at all times. Obviously, however, a small open run of this description affords no facilities for exercising. The birds can walk up and down or sun themselves on fine days ; but compared with the covered scratching run this open run is really of little consequence. If it is large enough to grow a crop of grass its value is considerably enhanced, and it is always a good plan to plant a few standard fruit trees in the open run, for the sake of shade and shelter, while in the larger grass runs a row of nut bushes will be an acquisition.

Interior Fittings

There are two or three items in connexion with the accommodation that need to be dealt with here. There are the interior fittings and accessories. Perches should not be less than 1½ in. across, and for the longer lengths 1½ in. square timber is the most suitable, whereas for shorter lengths 1½ in. by 1 in. material will answer the purpose. Perches should be removable, and made to fit into sockets. The droppings-board should also be removable, and should consist simply of a platform resting upon ledges about six inches beneath the perch, and extending out far enough to catch all droppings while the birds are sitting upon the perch.

Hoppers and Troughs

Receptacles for food and water should be fixed to the walls of the scratching-shed so that they do not get fouled by the birds, or take up any of the floor space. We shall deal with dry-mash feeding and dry-mash hoppers in a later chapter, but we would point out here that whereas all grain should be scattered among the litter to induce scratching, the mash food, whether dry or wet, should be served in hoppers or troughs, so as to prevent waste. For dry-mash feeding we recommend the type of hopper illustrated on page 70, but for wet mash a simple trough, made of two boards and two block ends, will answer the purpose. The difference between dry mash and wet mash will be found fully explained on page 69. Then we require a hopper for grit and oyster-shell or some material that will supply lime for the shelling of the eggs. This hopper, which should hang upon the wall, consists merely of a wooden or metal container, wide at the top, and covered with a hinged lid, and narrowing to the bottom, where the grit or shell trickles out into a shallow trough, providing a constant supply so long as the hopper is kept replenished.

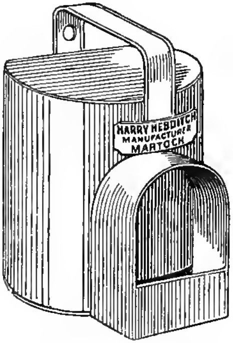


GRIT AND SHELL HOPPER.

For the water supply we may adopt a simple bracket for an open pan to rest upon, the bracket being fixed to the wall just within reach of the birds, but not so low that they can scratch litter into it. Or we may go in for a simple fountain such as that illustrated.

The Dust-Bath

The accommodation is now practically complete with the exception of a dust-bath ; for the only means by which fowls can refresh themselves and rid themselves of insect pests is by wallowing among dust and scratching it among their feathers. Where space is very limited they may have to resort to the litter in the scratching-shed, and such materials as peat moss and dry soil or sand are quite suitable when they are clean. But if there is room in the shed a corner should be fenced off with a 10 in. board, and the space should be filled in with clean dry soil, sand or fine ashes, and these materials must be renewed as often as may be necessary. A dust-bath may be made in the open run, but it must be covered over to keep the material dry, and even then, the birds will not be able to make such good use of it all the year round as they would if it were in the scratching-shed.



WATER-FOUNTAIN.

CHAPTER II

BREEDS AND BREEDING.

In the opening paragraphs of this book we referred at some length to the subject of breeding, because, as we explained, a great deal depends upon the class of stock one keeps. We must get rid of the idea that all hens are very much alike as regards productive capacity, and that laying is largely a matter of luck. Nor must it be supposed that when you have got the right sort of accommodation you have done all that is necessary to make success a foregone conclusion. If your accommodation is good you will certainly get more eggs from any class of stock, but though environment has a strong influence upon production it will not place a low-grade hen upon the same level as a bird that has been bred specially for egg production.

The utility fowl of to-day is a bird that has been bred expressly for utility purposes, and this fact needs to be emphasized, because little more than a generation ago the popular belief was that a utility fowl—pure-bred or cross-bred—was an inferior creature, not good enough for exhibition purposes. The exhibition breeder dominated the poultry industry in those days; and he sold his cast-offs for "utility" purposes at low prices, both he and his customers imagining that nothing more was meant by the term "utility." Since then, however, a different class of breeder has arisen. He is a utility specialist—that is to say, he breeds specially to develop utility qualities, notably egg production, and though he generally keeps pure breeds, he is not much concerned with external characters, and is satisfied so long as he retains a semblance of type without actually degenerating into mongrelism.

The utility specialist is the creator of our modern laying strains. He started by taking the best layers he could find and improving and increasing them year by year by constant selection of the most useful birds for his breeding-pens. The utility specialist is sometimes blamed for indiscretions that have resulted in the production of a large proportion of small eggs, and in the sacrifice of stamina; but such things are inevitable in all pioneer work, and it must be understood that we are still in the early days of breeding hens for egg production, a fact that is specially interesting because it evidences the opportunities that still exist for breeders, even on a modest scale, to take part in the interesting and profitable quest for the ideal utility fowl.

Laying Competitions and their Lessons

We lay stress upon this point because nowadays the small poultry-keeper is being encouraged to take a more active part in breeding layers. Up to within the last few years the laying competitions were almost entirely monopolized by the professionals and the large breeders, but more recently the scope of these contests has been considerably enlarged, and some are designed specially for small breeders, the competing pens consisting of two pullets only, instead of four, five, six or eight, which the larger breeders are able to spare. The consequence is that many small poultry-keepers have been stimulated to take a keen practical interest in breeding for egg production, and there have been some notable instances where success on a small scale has led to larger operations, and the abandonment of the old occupation for a new one with greater opportunities. One of our greatest utility breeders, whose name has become famous all over the world, started life as a small tradesman, and from a modest beginning as a poultry-breeder developed his business into a large and highly profitable concern.

This reference is not intended to tempt people to forsake their own vocations and go in for poultry-farming ; for that is necessarily a risky business for persons of little experience. The purpose is to encourage all who are able to breed at all to explore the possibilities of this interesting work by developing the productive habit ; and it is also hoped to convince those who do not breed that there is a great deal in keeping stock that have actually been bred for that particular purpose you have in mind. If, for example, you keep fowls to lay eggs, then it is to your advantage to possess birds in which the laying character has been developed by generations of selection and breeding for that particular purpose.

Breeding in Limited Space

It is not every small poultry-keeper who has opportunities to breed and rear his own stock, and there are good reasons why it is inadvisable to attempt this very particular work when space is limited. In the first place, young stock cannot be reared and brought up along with adults. They must have a separate run and sleeping quarters, and the more extensive their run the better their chances of making steady growth and developing healthy frames, upon which, of course, their future as layers depends. Apart from this, a small space in the garden can more profitably be devoted to laying hens than to the raising of young stock. The small covered run, such as we have described, provides excellent conditions for laying hens, but not nearly such favourable conditions for growing youngsters, which require more room and more natural surroundings. Pullets raised in close confinement do not, as a rule, make such good layers as those brought up under more natural conditions ; they are lacking in stamina, and there can be no more serious handicap than that.

Therefore we do not hesitate to declare that unless there is room enough to rear chickens in a grass run that has not been stocked with other birds all the year round, it is better to concentrate on keeping hens for egg production and to leave breeding to those who have the necessary space. That means that pullets will have to be bought, not only for a start, but to renew the stock from time to time. How long a hen may be kept with profit is a debatable question, and depends upon several circumstances ; but as a rule the owner of a small flock of layers may reckon upon keeping them for two laying seasons, roughly two years, unless he finds one or more birds of exceptional productive character, or others of inferior capacity. In the former case he may keep a hen for a third season, or use her for breeding ; while in the latter case he will get rid of her after one season, and fill her place with a pullet of better capacity.

Trap-nests

Readers will ask how they are to tell the good layers from the bad ones, so that they may get rid of the latter, and raise the average production of their flocks. The large breeders employ a contrivance known as a trap-nest, which automatically closes when the hen goes on, keeping her confined until she has laid her egg and some one comes to release her. Every hen bears a numbered ring upon her leg, so that when the bird is released from the trap-nest she is identified by her number, and the egg is credited to her upon a card or egg chart affixed to the wall of the house. Trap-nesting is the only sure way of keeping individual egg records, but it has one very big drawback—it requires frequent, if not constant attention during most of the day to let hens off when they have laid, and to reset the traps. The large utility specialist can afford to employ labour for that purpose, but the average small poultry-keeper will have to carry on without trap-nests because he cannot devote the necessary time to them.

Flock Averages

The only alternative is to keep flock records and to rely upon observation for the rest. One cannot, of course, keep anything like accurate individual scores by that means, but one can form an idea as to whether or not one's flock is of high productive standard by taking the average production. In any case, every small poultry-keeper should keep an egg record chart and enter upon it the number of eggs laid each day, for it adds greatly to the interest and pleasure of poultry-keeping, besides providing a useful guide as to the character and condition of one's stock. A simple egg chart for a year can be made by ruling lines upon a piece of cardboard, so as to provide twelve squares down, for the twelve months, and thirty-one squares across, for the days of the month, the days' totals of eggs being entered in the squares.

The aim of every poultry-keeper with six to a dozen hens should be to secure a flock average of 200 eggs per bird in a year. Many have done it, by starting with well-bred pullets and keeping them under favourable conditions, but one need not be ashamed if at the first attempt one attains an average of 150 eggs per bird from a small flock. The larger the flock the lower the average will be because it is not so easy to observe and to weed out the poor layers. That is essential if you are striving for a high egg average, for in every flock of pullets, though bred from the same stock—and high grade stock, too—you will find considerable variance. You may have one or two pullets that lay 260 or 280 eggs in a year, others that go up to 200 or 220, some that hover round about 140 to 160, and a few that will not get beyond the 100 mark. Obviously, these last-named bring down the average of the flock, so that if they could be identified and got rid of it would make a considerable difference not merely to the average, but to the profits.

There are means of forming a very good idea of the productive capacity of one's pullets, which, though they may seem obscure to the average beginner, are worth noting, because as he becomes more acquainted with poultry he can put them to the test and learn by experience how to utilize them. Experience is a very big factor in poultry-keeping, and though we write books to enable the uninitiated to keep poultry successfully, it is with the idea of guiding their efforts in the right direction so that they may gain experience of the right kind. That is buying experience in the best market, but many people buy it dearly by ignoring or neglecting good advice and starting out with the wrong ideas, or no definite ideas at all.

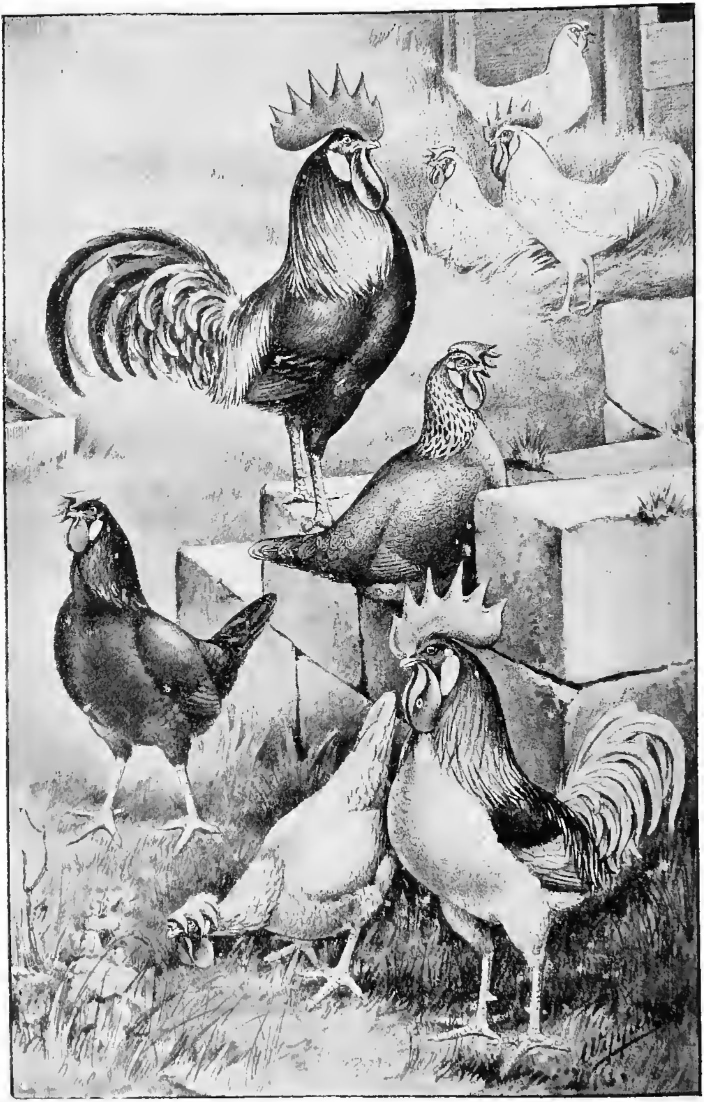
Selecting the Best Layers

One method of gauging the productive capacity of pullets is by noting when they begin to lay. Suppose we have a flock of twenty pullets, all hatched at or about the same time and brought up under the same conditions. They were hatched in March or April, and we are aiming for autumn and winter egg production, so that in all probability some will begin to lay in September, a lot more in October, and others will hang fire and produce no eggs until November or December. Now, if we were to conduct a test during the following twelve months, we should doubtless find that, provided conditions were equal, the pullets that started laying first would be the best producers over the whole year, and the late starters would be the inferior layers. That at any rate is a useful basis for observation, and a guide to work to when it comes to weeding out pullets at the beginning of the laying season.

The Hogan System of Hand-Grading

There is another method of gauging capacity and probable productivity—by handling. This is sometimes called the Hogan system, after the late Walter Hogan, a Californian utility specialist who was one of the first to discover that you could gauge a hen's egg capacity by her build and bone formation. This system has its limitations, and it must not be supposed that it is possible to forecast how many eggs a pullet is going to lay. That will depend upon her environment, and you must not expect to learn more from the handling test than whether she is likely to be a good, a moderate, an indifferent, or a bad layer. Exponents of the handling system of gauging capacity place much importance upon length and width of back, distance between legs and depth of abdomen. Obviously, those features are essential to laying capacity. Then come pelvis measurements. The pelvic bones are practically a forked continuation of the backbone. They extend downwards and outwards from the backbone, and will be found one on each side of the vent. Coarse, thick pelvic bones are an indication of a poor layer, whereas in a good layer these bones will be fine and straight, with about three fingers' width between them when the bird is laying. At the same time you will find four to five fingers' width between the pelvic bones and the point of the breastbone ; whereas in a poor layer it would not exceed two or three fingers.

But it must be understood that so far as these bone measurements are concerned, the test is only reliable when the birds are laying, for when a hen ceases to lay the bones close up together. It is very similar with the pelvic bones of all females. The bones open to give birth, and close again after birth. A hen, of course, is constantly giving birth during her laying season, so that the pelvic or pubic space is always wide. This must be noted, because a good hen that had fallen into



BLACK HEN. BROWN COCK AND HEN. WHITES.
PILE HEN AND COCK.

LEGHORNS.

moult and left off laying would show very little capacity, because the bones would have closed up, and it would not be fair to compare her with another hen in full lay.

Other Tests for Selection

This narrows down the possibilities of selection by handling, at any rate in regard to pelvic capacity, though with some experience one can always form a pretty good idea from the texture, and from the general appearance and habits of the birds. Good layers are brisk-looking and active, their eyes are prominent, not sunk under heavy brows, and they usually carry their tails high; while the poor layers are dull and lazy, and they have a sleepy look about them. There is another plan of identifying poor layers towards the end of the laying season, at any rate in yellow-legged breeds such as Leghorns, Wyandottes and Rhode Island Reds. They start the season with bright yellow legs, but constant production makes such a drain upon the pigment in the system that by the time they have been laying for five or six months their shanks will have turned almost white, and they will not regain their usual rich yellow colour until the birds have moulted and had a rest.

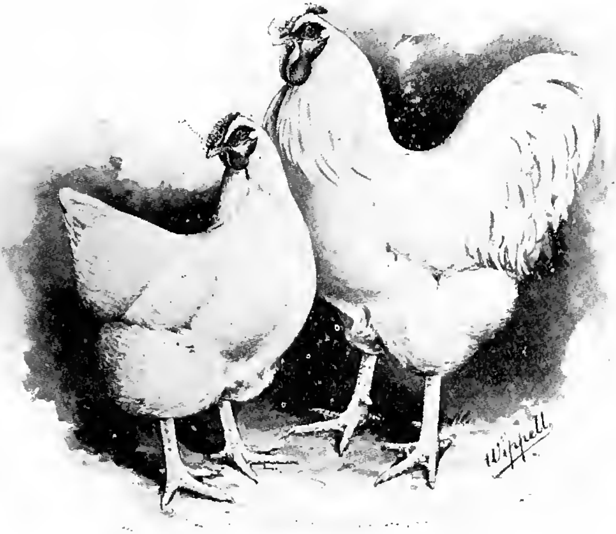
The beginner should bear these methods of selection in mind, and practise them as opportunities arise. His egg chart may reveal a low average per bird, which may, of course, be due to failure to lay in winter, which he must remedy by adopting different or better management. But if his hens did their share during the winter months, and the average is still low, it is probably because there are one or two low producers in the flock, and his business should be to find them out and get rid of them, especially if he is going to breed from his stock, for to breed from inferior layers means perpetuating that class of bird.

Breed Classification

Our readers will now be asking which is the best breed. Briefly, there is no such thing as a best breed, though certain breeds are more suitable than others for particular purposes. Poultry may be divided into three classes: the laying breeds, the general purpose breeds, and the table breeds. In the first class we include the non-sitting breeds, such as Leghorns, Anconas, Campines and Minorcas, which are excellent layers, but very inferior table birds. The general purpose class includes the larger, heavier and sitting breeds that make useful table birds besides being first-class layers. These include the Wyandottes, Rhode Island Reds, Plymouth Rocks, one or two varieties of Orpingtons, and even the Sussex, although the last-named breed is generally included in the table class. It is, indeed, a first-class table breed, though not quite such a free egg producer as the others. In the table class proper we may include the Dorking, and also the Faverolles, these being fine in bone, quick growers and ready producers of flesh.

Strain Variations

But after all, fowls differ in strain far more than in breed. Take the White Wyandotte, for example. Some strains have been developed specially for exhibition purposes, others have been bred for heavy egg production, and others for just mediocre general usefulness, which means that they have not been bred on special lines at all. So when we say that the White Wyandotte is a good laying breed we are referring to those strains that have been specially bred for egg production, and when we recommend White Wyandottes, or any other breed, for that matter, we leave it to the reader to see that he gets birds of the right strain and class. There are many good laying strains of White Wyandottes and White Leghorns, and most of the best laying records have been put up by one or other of these breeds, because



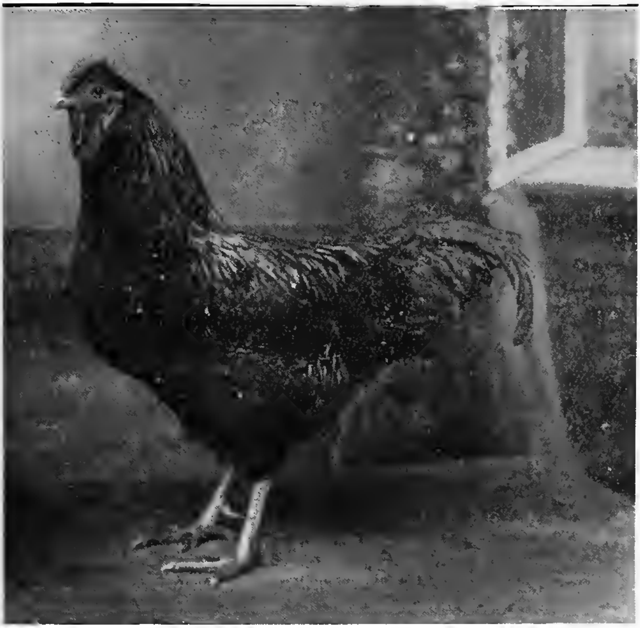
PAIR OF WHITE WYANDOTTES.

they were the first to receive serious attention from specialist utility breeders. In course of time, it may be that Rhode Island Reds, Black Leghorns and Anconas will become equally popular, for already there are some good strains of these. But for the time being one is more likely to find good laying strains in White Wyandottes and White Leghorns than in any other breeds.

The Minorca was always a popular breed for small runs, but it has always been under suspicion as regards hardiness, and up to now it has not been bred strictly on utility lines. Some people will have their fancies, and will prefer to keep a breed they know and like, though it may mean sacrificing productiveness to some extent. They may have a leaning towards the fancy side of poultry-keeping, and they may place more importance upon getting pleasure out of their birds' appearance than profit out of their eggs. There is no reason, however, why a flock of strictly utility birds should not look nice, even though they do not possess exhibition points; and the purpose of this book is to show amateurs how they can get the maximum profit out of their fowls, from which we think they will derive ample satisfaction.

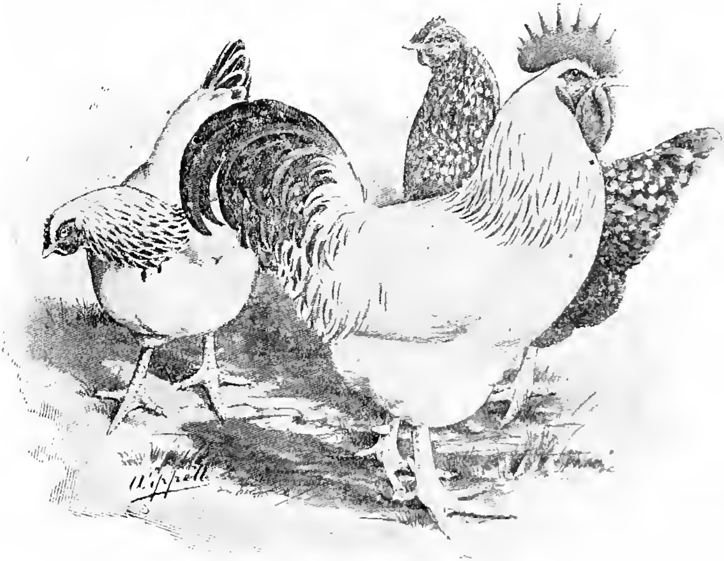
Breeds for Confinement

As regards suitability for close confinement, there is not much to choose between the light, non-sitting breeds, such as Leghorns, Anconas, and Minorcas, and the medium-heavy, sitting breeds, such as Wyandottes, Rhode Island Reds and Sussex. The non-sitters do sometimes become broody, which is merely a reversion to a natural trait, but compared with the sitting breeds they save a lot of time in spring and summer, when the latter indulge in broodiness pretty frequently; and under intensive or semi-intensive conditions the non-sitters are just as hardy as the others and just as capable of giving good results in winter egg production.



A ROSECOMB RHODE ISLAND RED COCK.
Bred by F. E. Mason, Timbersbrook House, Congleton.
A WELL-KNOWN WINNER.

On the whole, therefore, basing our estimate upon our own experience, we do not hesitate to say that there is no better breed for the small poultry-keeper, who must accommodate his birds in confined quarters, than the White Leghorn, by which, of course, we mean a good strain of White Leghorns. Where there is room to rear a few chickens and to raise a few table birds we would prefer the White Wyandotte, and next to that the Rhode Island Red; while those who want to make a feature of good table birds, and have the room to do it in, cannot improve upon a good utility strain of Light Sussex. Next to these we nominate Black Leghorns and Anconas as light breeds, and Buff Rocks, Buff Orpingtons, and Speckled Sussex as general purpose breeds, beyond which there is not much need for the small poultry keeper to concern himself.



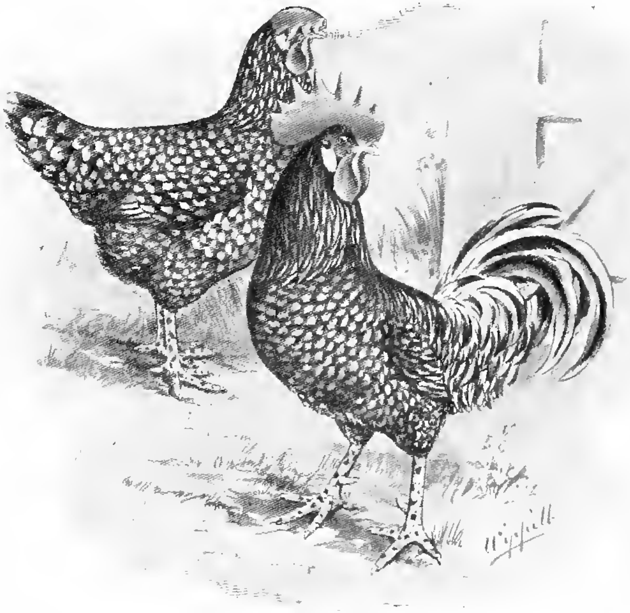
PAIR OF LIGHT SUSSEX AND SPECKLED SUSSEX HEN.

The Time to Start

The next question is as to the best time and the best way to make a start. That will depend to a large extent upon circumstances ; for if the space available for poultry operations is only sufficient to keep a few laying hens it is obvious that the stock will have to be bought, and the best time to buy is in the autumn or early winter. If, on the other hand, there is room to rear young stock, a start can be made with a modest initial outlay in the spring by purchasing eggs for hatching or day-old chickens, and rearing the youngsters so that the cockerels can be killed for the table, and the pullets can be kept on for laying in the following autumn. In this case, of course, one has to wait a long time to get any return, but with a fair expanse of ground, good management and just a bit of luck, one can rear pullets more economic,

BLACK MINORCAS.

ally than one can buy them; though we must repeat what we have already stated—that pullets reared in very close confinement are not equal in stamina and productive power to those reared under more natural conditions.



PAIR OF ANCONAS.

Buying Pullets

Let us suppose, then, that we are starting in the autumn by buying a few pullets of the breed preferred. Pullets are a better investment than hens because you get them at the beginning of their career, and fowls lay more eggs in their first season than in any other, as we shall explain presently. They cost more than hens, but they are better value, and to start well always make sure of getting pullets. And this raises a very important point. How can you make sure that you are buying genuine pullets, and birds of good laying strain? The only certain way of doing that is to have dealings with a breeder of good reputation—a real breeder, and not a dealer—or to buy your birds from, or through, a friend or someone you can trust. Do not on any account be led away with imagining that you are doing a smart thing by buying the cheapest birds. You can find thousands of people who have gone astray in this way, and probably thousands more will do so, because the desire to economize is a very common, and within reason, a very desirable trait. Moreover, the person who has little or no knowledge of poultry does not realize the danger he is running, and he does not see why he should pay one man 15s. for a bird when he can get the same thing (apparently) for 7s. 6d.

Cheapness and Inferiority

This tendency to look for bargains, or what appear to be bargains, has given an opportunity to many dealers who are only too ready to take advantage of it. Some are honest enough, for they give the seeker after cheap birds full value for his money, though necessarily the birds they sell are of inferior character; but others are unscrupulous, and do not hesitate to call old hens pullets, and to lead purchasers to believe they are getting first-class utility birds when really they are buying old and useless creatures. The craze for cheapness is therefore a grave danger to the uninitiated; and even to those whose means are very limited it is fatal to make a start with cheap, inferior birds, for results depend upon individual quality, not upon the number of birds you keep.

If, let us suppose, you have only £5 to spend upon stock, do not try to spin it out by getting as many birds as you can for the money, for you are likely to get absolute " wasters " that will not pay for their keep. Far better have half the number of good birds, which will yield a good average and return considerably more profit than you would get from twice the number of " duds."

Stock for Laying and Breeding

It is impracticable at the time this book is being written to state the prices at which good pullets should be bought. Prices were very high during the war; and at one time one had to pay 25s. or 30s. each for pullets upon which one could rely. Since then prices have fallen and they are still falling, so that current advice on this particular point, and any other point not dealt with here, should be sought through *The Bazaar*. In buying birds from a good breeder of laying stock, however, one must differentiate between birds intended for breeding from and, indeed, for founding a stud, and those intended merely for laying. If we were starting poultry-keeping with the intention of breeding and getting as high as we could in the pedigree-laying business, in hope of taking part successfully in some of the laying competitions, and so making a name for our strain and creating a ready demand for our eggs for hatching purposes and our young stock for breeding—if, indeed, we aspired to become successful breeders like those from whom we purchase our stock—to commence, we should go to a first-class breeder and buy a select, even though small, pen of birds with guaranteed pedigrees so as to be sure they were descended from generations of heavy layers. We should probably have to pay from £2 to £5 each, or even more in some cases; but if we were getting really good stock that would not be extravagant, for the investment would set us on our legs, and we should expect to breed and rear a lot of good youngsters.

But if we could not go in for breeding, and if we wanted pullets solely for laying, we would not be justified in paying such prices, and we might not go to the same class of breeder. We might go to a farmer or to someone in our own district who kept the right stamp of stock, and who had started from one of the big specialists on the lines suggested above, and very likely we should get good, healthy pullets for less than the big professional breeder would charge. The smaller breeders, not being so well known, cannot demand the same prices as the more famous ones, though the pullets they offer may be just as good. This is where a prospective buyer can save if he is sure of his ground; but he must avoid the lure of the cheap and nasty class of stock.

Starting with Eggs or Chickens

If it is desired to start in the spring one can still buy pullets or hens for breeding, though, as the laying season starts in the autumn, it follows that we should be missing half the birds' first-year production, so that we should expect to buy them cheaper. Or we can buy some eggs for hatching, or some day-old chickens, from a reliable breeder of laying stock, and try our hands at rearing. If that is done it will be advisable to hatch the heavier breeds, such as Wyandottes, Rhode Island Reds, etc., not later than the beginning of April, and the lighter breeds, such as Leghorns, not later than the end of April. Otherwise we might not get the pullets on to lay before winter set in, while if we hatched heavy breeds before March, and light breeds before April, the pullets might begin to lay in summer and then moult in the autumn like the old birds.

Influence of the Male

There are several fundamental principles to be borne in mind by all who go in for breeding poultry for egg production, assuming that they want to get first-class results. It is important to breed from good hens, that are descended from a long line of good layers and have given good results themselves; but it is even more important to breed from a male descended from first-class hens—mother, grandmother and so on—for it is generally conceded that laying character is inherited mainly through the male line; that is to say, a race of heavy laying hens will transmit their character not so much through their daughters as through their sons. That is why specialist utility breeders place so much importance upon securing cockerels with long pedigrees showing the productive ability of their ancestors, and the lesson it teaches the average small poultry-keeper is that it is no use buying a cockerel casually if he is out to develop the productive character of his strain. Leaving things to chance is not sound policy for the breeder of poultry.

In-breeding

Though the skilled breeder may indulge in in-breeding—that is, breeding from birds that are more or less closely related—to a modified extent in order to fix and make more permanent the productive character in a strain, that plan cannot be recommended to the average amateur, who will find it more satisfactory to obtain an unrelated cockerel to mate with his hens every year, so long as he makes sure that the bird comes from stock of the best class. If he is of the same strain as the hens, but not closely related, he may give better results than a bird from another strain, for there are many sub-strains descended from the same original stock, and it is by breeding judiciously among these that the specialist attains the best results.

Matured Hens the Best Breeders

Hens in their second or third seasons make better breeders than pullets, being more matured, but cockerels are generally more reliable stock getters than old cocks. Really good hens are worth keeping for breeding purposes as long as they are healthy and lay a fair number of eggs, but it is inadvisable to keep a male for more than two seasons. A good mating is a first-season cockerel with second- or third-season hens, though a vigorous second-season cock will give as good results as regards fertility, and he may throw a larger percentage of pullets. There is no reliable method of influencing the sex of progeny, and it is not possible to forecast the sex of the germ contained in an egg, although some people claim the power to do so by means of instruments; we have had this matter under investigation for the last twenty years and it remains, as much a mystery as ever.

Mating the Pens

The number of hens that may be mated with one male depends upon circumstances; on free range a vigorous utility White Leghorn cockerel might run with as many as twenty hens, but in an enclosed run fifteen would be sufficient; while for a second-season cock the numbers should not exceed fifteen and ten respectively. It is not advisable to run less than eight Leghorn hens with a cockerel if he is vigorous. With the heavier breeds about fifteen or sixteen hens might be run with a cockerel on free range, or a dozen in a confined run; while a second-season cock should not have more than a dozen hens on free range and eight in confinement. For larger flocks two or more males may be run together in about the same proportion, but this plan does not answer so well in runs of limited extent as on free range, where there is plenty of room for the birds to keep away from one another.

If the same male is kept on for two seasons let him be removed from the stock pen when the breeding season is over, say in June, and run him in a separate pen, right away from the hens, until it is time to mate up for the following year, say in December or January. He may run with, and will look after, a flock of cockerels, but he should not come in contact with females during his period of rest.

CHAPTER III

FOODS AND FEEDING.

FEEDING is another of the important factors in the successful keeping of poultry. It plays a great part in egg production, and the influence of a good feeder goes a long way in putting up big egg records. By a good feeder we mean one who understands the requirements of his stock and exercises his judgment in meeting their needs. We must impress this point, because many people seem to think there are, or ought to be, fixed and definite rules for the feeding of fowls. Rules there are, of a kind, though we prefer to call them principles ; but it is not practicable to fix minute details, for reasons which we shall explain.

We have heard people complain that they have never discovered a writer of a poultry book who was able to explain clearly and definitely just how to feed fowls, especially as regards quantities. That is because the needs of hens vary under different conditions, and it would only be misleading to lay down hard-and-fast rules. Other people say that writers are in the habit of describing menus for fowls, the ingredients of which are not always obtainable by the small poultry-keeper, who frequently buys his foods in small quantities from a local shop-keeper. We can appreciate that complaint, and we understand the importance of recommending for amateurs a simple system of feeding and at the same time an efficient one. We do not propose to puzzle our readers by setting them tasks which they cannot perform, and, as a matter of fact, we are drawing entirely upon our own experiences extending over many years, during which we have always worked on the simplest lines that would give us good results.

Elements of Foods

In tackling this subject of feeding it is necessary to understand that laying hens, growing young stock and table fowls all require special feeding and special ingredients, and to treat them all alike would be a mistake. The chief elements of foods are albuminoids or proteids, which are the flesh producers and egg producers ; carbohydrates, which provide bodily heat ; fats, which have a similar effect ; and mineral salts, which tone the system and purify the blood. The proportion in which these elements are found varies considerably in the many different foods, but the ideal ratio for laying hens is one part albuminoids to four parts carbohydrates and fats together. Of course, the average poultry-keeper cannot analyse his foods to see if he has got the correct ratio, but when he is feeding for eggs he should remember that cereals and cereal products—that is, grain and meals—are lacking in the proteid element. A good sample of wheat, oats and maize would not work out better than one to six or even one to seven, so there is a shortage of egg-producing ingredients. If the mash is made up with house scraps and cooked vegetables the shortage becomes more pronounced because such materials contain very little in the nature of flesh-formers. The obvious remedy is to make good the deficiency, and the only way to do that is by adding something which is rich in proteid elements. The most popular plan, and the most effective in our experience, is to add meat meal or fish meal to the mash, and we shall explain presently how this can be done and in what quantities.

First of all, however, it must be understood that fowls need to be fed with consideration for the purpose for which they are being kept, and with regard to the season and the general conditions ; a growing pullet must not be fed in the same way as a hen in full lay, for the diet that would be needed by the hen to maintain the production of eggs would force a growing pullet on to lay at an unnaturally early age. Moreover, one should not feed a hen when moulting and resting, in the same way as when she is laying ; but in every case one should endeavour to meet the current requirements of the birds.

House Scraps

The utilisation of house scraps and waste food of any kind is an important feature in the householder's scheme of economical poultry-keeping ; and it is this which gives the small poultry-keeper such a great advantage as compared with the larger poultry-farmer who has to buy practically all the food his fowls eat. The "Daily Mail" has carried on some important propaganda in the interests of economical egg production by pointing out how eggs can be produced more cheaply in back-gardens than anywhere else ; and it is perfectly true that with good management a small flock of hens in a town or suburban garden will realize the maximum rate of profit. The food suitable for the mash includes bread crusts and stale bread (not sour), pastry crusts, surplus vegetables of all kinds, milk puddings, and anything of that nature that is saved from the kitchen or table, while scraps of meat, fat and gristle may be cut up and mixed with the mash or served separately. Where there is a fair amount of this kind of waste food it will not be necessary to give meat meal or fish meal, as the proteid elements will be well provided.

Preparing Scraps for Feeding

Such foods as bread and the like need to be scalded before use, and when well soaked they should be mixed with meal of some kind. Other waste food, such as the outer leaves of cabbages, potatoes and other roots, pea and bean pods, etc., must be boiled soft so that they can be mixed into a mash. But as we have said, the use of such materials lowers the proteid ratio, so that it must be made up by adding the ingredients that are lacking, and of which the birds stand in need, according to whether they are being fed for eggs, for growth, or for the table.

A Simple Feeding System

To make the matter as clear and as definite as possible, we cannot do better than describe with some detail our own methods of feeding, which are sufficiently simple to be within the means and reach of every one. Throughout the year we start the day with a feed of grain scattered among the litter in the scratching shed. This differs from the old-fashioned idea of giving a feed of mash first thing, and giving it hot in the winter in the belief that it would warm the birds and stimulate egg production. That, however, is a vain belief, for hot food has no influence whatever upon the productive organs. On the other hand, the early morning feed of mash has one great objection, for it is in the morning that we want the hens to take exercise, especially in the winter, and a hen gets no exercise by standing up to a trough and filling her crop with mash. Moreover, when she has had her fill she has no incentive to go scratching about after more food, but will retire to a quiet corner and stand still, with unfortunate consequences when the weather is cold.

Warmth through Exercise

We and all practical progressive poultry-keepers make sure that our hens get themselves warm naturally by exercising among their litter. As soon as it is light enough for them to see in winter their grain is scattered among the straw, or if the place is rat and mouse proof, as it can be made by methods we have already described, the grain is thrown down overnight, and the birds are able to start work first thing in the morning. Some people say the grain should be buried, but that is unnecessary and undesirable, so long as the litter is not too heavy. The hens will bury it themselves, especially if the litter is of a strawy nature.

The Grain Food

The materials used for the grain food consist of mixtures ready made up by the corn merchants, or mixtures made up at home. In the latter case we generally make the mixture in summer of three parts wheat, three parts oats and two parts kibbled maize, but in winter we give these three in equal parts. Kibbled or cracked maize is much to be preferred to the whole grain, and it costs only a trifle more. Sometimes we get dari, which is of similar character to wheat, and we have given a few split peas occasionally, these being richer in proteid elements. The ready-made mixtures generally contain wheat, oats, maize, barley, and occasionally dari and a few small grains, but the character and feeding value of these mixtures varies. During the war we had to give our fowls all manner of rubbish, and we were glad enough to get it ; but even now, though foodstuffs are plentiful, some corn merchants are selling poor materials, their idea being to put in the cheapest grains and to make as much as they can out of it, regardless of its feeding value. Happily, a good many corn merchants are now getting up-to-date ideas about poultry, and they are catering for the more enlightened poultry-keepers of to-day by offering sound materials, at a fair price. We advise readers to try their local corn dealers and to ask for a good sample of mixed poultry corn. If it is poor—if the oats are light, the wheat shrivelled and the maize whole—try elsewhere until you discover a dealer who understands your requirements. We regret to say that some of the grain mixtures, also the meals, sold by village stores are mere rubbish and quite unsuitable for feeding poultry.

How Much to Give

With regard to quantity, we do not bind ourselves to weights and measures, but we give approximately a man's handful of corn to every bird, more or less, according to the condition of the birds and their needs at the time. If they are in full lay they need more than if they are idle; and that rule must be borne in mind specially in autumn and early winter, before many of the pullets and hens have come on to lay. It is not easy to tell when you are giving hens too much corn, for it gets covered with the litter, but if the litter is raked or forked over it will soon be seen whether the birds are leaving any of their corn. In good feeding everything should be eaten up at once, and we may say that it is somewhat unusual to find grain lying about if the handful-per-bird rule is adhered to, unless there is some grain the birds dislike. That is sometimes the case when they are given a grain they have not been accustomed to. They will pick out their favourites and leave the strange grain—that is, until they get used to it, which is generally within a few days.

This scratch grain, as we may call it, will keep the birds busy for an hour or more in the morning, according to the amount of litter they have to turn over. It is neither desirable nor necessary to keep birds scratching all the time, and they need plenty of rest during the day. But the morning is the best time for their scratch food, because in winter they need the exercise to get them warm, and in summer it is cooler in the early hours and they are more inclined to take exercise. This scratching exercise is not necessary for birds on full range, except in winter, when they have fewer opportunities for running about in the open; but it is absolutely necessary for birds in confinement because they have no other means of taking exercise, and without it they would become fat, and they would lack the condition that is essential to production.

Green Food

To proceed with our system of feeding, we generally give a small feed of grain at midday in winter, just to keep the birds on the move, and also a few scraps, especially meat and gristle, but not a heavy feed. The quantity of grain is from a fourth to a half of the morning feed, according to the amount of scraps available. At this time we also give fresh green food, which is essential for all stock because it contains the mineral salts that purify the blood. Fresh young grass is as good as anything, and birds on a large grass run need nothing more, except perhaps in a dry summer ; but one must not depend upon the grass in a small run, which soon becomes worn, or becomes so foul and coarse that the birds will not eat it. Anyone who has a vegetable garden can grow a supply of green food to last a small flock of hens all the year round. Cabbages, broccoli, and kale provide a long succession, the coarser leaves and the stumps being saved for the fowls, while in between these crops there is nothing better than lettuce. Chopped or pulped turnips and kohl-rabi are useful for a change, while spinach and green clover have excellent medicinal properties. Dandelion leaves are also good, and some people give their birds boiled nettles. When supplies of green food run short in winter, the best plan is to obtain some swede turnips ; split each root in half, and nail each half to the wall of the shed so that the birds can peck out the flesh. All green food should be given either hung up just within reach of the birds, or in racks or netting bags, for if thrown on the ground a good deal will be fouled and wasted.

Wet Mash

After this the birds get nothing until the third and last feed of the day, which consists of wet mash. We have explained why we do not give the mash feed in the morning, and there are two reasons why we give it in the evening instead of at midday, one being convenience, and the other the fact that we let our birds eat as much mash as they can store away in their crops, We have no objection to giving a little grain in the evening to finish off, but it is not necessary, and we have found no justification for the theory that hens must have grain in the evening to keep the digestive system going through the night. We give the mash in wooden troughs, and we get to know by practice about how much the birds will eat. The mash is put in the troughs half an hour or an hour before sunset, or earlier at mid-summer, so that the hens have plenty of time to eat what they like, and to come back to it if there is any left. We like to see them clean it up, and go off to roost satisfied; if they hang about after the meal they evidently want more, and if there is any left one need not be alarmed, but the food should be removed from the trough, and kept sweet to be used up next day. The troughs should be scraped clean and scrubbed out occasionally.

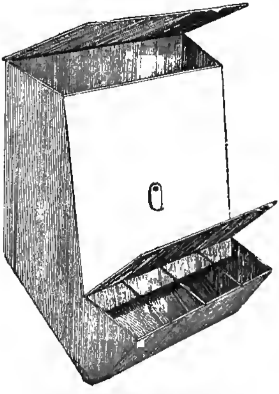
As to the composition of the wet mash, we rely largely upon house scraps to make the body. We get a quantity of bread crusts and stale bread from our own table and from one or two friends, and these are scalded and left to soak till quite soft. Any surplus cooked potatoes and other vegetables are then added, and the body of the mash is then ready to be dried off with meal. For this purpose we sometimes use a proprietary laying meal, ready-mixed by a firm that specialises in that kind of thing; and with a good proteid ratio. Such meals, being blended specially for promoting egg production, will spare the average novice a good deal of anxiety, and they will save him trouble if he finds any difficulty in getting the right ingredients to make up his own meal. Some people merely dry off their mash with middlings (sometimes called sharps or toppings) or barley meal, but that does not give a well-balanced diet, being notably lacking in proteid or egg-producing elements. When we mix our own meals at home we generally use middlings, bran, fish meal and clover meal. Some people make a wider choice, but these are sufficient, and they make the matter simple because they can easily be obtained. A good blend for drying off is two parts (by measure) middlings, one part bran, one part fish meal and one part clover meal. The last-named contains mineral salts, and is rich in lime, which helps in the shelling of eggs. When mixed with the wet material, this, it will be seen, gives a proportion of about ten per cent fish meal in the whole mash, which is about right; so if any other meals are used in place of, or in addition to, those mentioned, add the fish meal in about the same proportion. It must, of course, be mixed with the dry meal to get it evenly distributed, so it amounts to twenty per cent of that meal when dry; but calculating the wet body of the mash as about equal in bulk to the dry meal, the two, when mixed together, contain about ten per cent of fish meal. We may add that the dry meal is poured over the wet mass and mixed first with a spoon, and then kneaded with the hand to get it into a fairly dry, sticky consistency.

Summer and Winter Feeding

The method of feeding we have explained is for laying stock, and the chief difference between the winter and summer diet is that we give less maize and add more bulk to the mash, by adding more cooked vegetable matter, in summer. Also we reduce the amount of meat or fish meal somewhat, though in this connexion it should be noted that a stimulating diet will keep hens laying for a longer period in summer and early autumn, while a non-stimulating diet will hasten the moult. Moreover, if our birds were running on free range in summer we should cut out all stimulating food, such as fish meal, etc., because they would be able to find natural proteid food, such as worms, grubs, and insects. We might add that if house scraps and waste food are not available to make the wet body of the mash, biscuit meal or a prepared cereal such as " Uveco " can be used, and as biscuit meal generally contains meat it will not be necessary to use so much fish meal, if any at all.

Dry Mash

There is another system of feeding known as the dry-mash system, which has distinct advantages for those poultry-keepers who have to be away from home and cannot find time to mix the wet mash. This method consists simply in giving the meal in a dry state. It is put into a hopper, and the birds are able to help themselves when they please, taking a few mouthfuls of dry meal and then going to wash it down with a drink of water. Consequently, they do not gorge themselves, but they get enough, and they are kept interested all day long, so that the system works out perfectly well. It is, indeed, in very general use on large poultry farms, where the saving of labour is an important consideration ; with a small poultry-keeper, however, the saving of labour does not really matter, so long as his occupation permits him to give attention to his fowls, and there is one potent argument against the adoption of the dry-mash system for householders—it does not give an opportunity for using up the house scraps and waste food.



DRY-MASH HOPPER.

With the wet-mash system, as we have seen, the house scraps make up something like half the food, and that is an important economy which cannot be discounted by any saving of trouble in cases of this kind.

But for those who desire, or find it necessary, to practise the dry-mash method, the following is the plan of procedure :—Begin the day as usual with a feed of grain scattered among the litter ; then, if you are going away for the day, open the hopper and see that it contains enough meal to last the whole day, and that there is an ample supply of water some little distance away, even at the opposite end of the scratching shed. Green food and grit must also be left. To save further trouble, a ready-mixed dry mash can be bought, properly balanced to promote egg production; but if you care, or find it more convenient, to mix your own mash, a very simple formula is four parts middlings, two parts bran, one part clover meal and one part fish meal. There are many more ingredients that can be included in dry mash; but here you have the chief requirements, and it is an important consideration that the ingredients are obtainable from any town or country corn dealer.

The hopper for the dry mash should be fixed to the wall within easy reach of the birds, so long as they cannot scratch litter into it. The container part should hold enough food to last for several days; and the tray from which the birds eat should be divided so that they cannot get into it, and foul and waste it. A little waste is inevitable, since the birds invariably scatter some dry meal when they eat; but one of the best types of hopper is that which has a narrow platform in front, this being fixed about 18 in. above the floor, so that the birds have to fly up to it when they want to eat.

Feeding Growing Stock

The feeding of growing young stock differs considerably because the aim is to maintain steady development. Therefore, to give the same food for laying hens and for growing youngsters would be a mistake, since the high proteid ratio would force growth too rapidly, and very likely bring pullets on to lay prematurely. We shall deal more fully with the feeding of chickens during the actual rearing stage; but for the growing stage (from two months onwards, we want a fairly bulky and nourishing diet). One particular class of meal stands out as being specially suitable for growing birds—Sussex ground oats. It consists of the whole oats ground fine, and it is about the best fattening meal. We make up the young stock wet mash almost entirely with this and a little clover meal to dry off the scalded house scraps and vegetables, or if such scraps are not plentiful enough to supply both hens and young stock, the latter have the body of their mash made with "Uveco." Fish meal or meat meal is not given; but if the birds are not making satisfactory growth, especially if they are kept in close confinement where they cannot get worms and insects, they may be given a little lean meat or gristle, or a teaspoonful of green bone every day, so long as it is discontinued if it is seen to be bringing pullets on to lay too soon. Green bone is simply uncooked bones, especially marrow bones, which can be cut up in a mill specially made for this purpose. Such a mill is very useful to a poultry-keeper, for if a plentiful supply of fresh green bone is obtainable from a butcher it can take the place of fish meal, being given either in the mash or separately. For grain the young stock may have wheat, oats, and a small proportion, say an eighth, of cracked maize, with dari when obtainable. Grit and green food must be provided.

Grit and Shell

The purpose of grit is to assist in digesting the food. Whether or not the grit actually grinds the food has not been scientifically determined, but we find it among the partly digested food in the fowl's gizzard, so that evidently it serves some purpose in that connection. Fowls will always pick up small stones, though those that are not sharp can be of little use to them. Flint grit is the best, being sharp and durable, and it can be bought very cheaply. Oyster shell is necessary to provide lime for shelling eggs. This material is scarce at times, and the best substitute is limpet shell, while broken crockery and mortar can also be used for this purpose. These materials should always be available in the run or scratching shed, more especially for birds that are kept in confinement.

Fattening Table Fowls

The fattening of table poultry is a special subject that will not appeal to the average small poultry-keeper, except as regards the feeding of his surplus cockerels. The specialist poultry fattener feeds his poultry on forcing principles, resorting to a cramming-machine in the later stages, but the amateur must depend upon voluntary feeding, encouraging his birds to eat as much as possible. For this purpose Sussex ground oats is the best meal, and if it can be mixed with skim milk or buttermilk so much the better, while scraps of fat are helpful. Two feeds of this soft stuff should be given in troughs every day, with a feed of mixed grain in the evening.

Overfeeding

With many small poultry-keepers there is a dread of overfeeding, but the danger of this is very much reduced when (1) the birds are of productive character, inheriting the ability to convert the food they eat for the purposes of egg production ; and (2) when they are kept on scratching shed lines and get plenty of exercise. It is not so much excess of food as lack of exercise that makes hens fat. While a hen is producing eggs she must have plenty of food, first to sustain bodily condition, and then to recruit the constant wastage, if it can be called wastage, that goes on in the egg-producing organs. A hen is most likely to become too fat when she is not laying, but as a rule she does not eat so much at that time, and plenty of exercise will correct the tendency to put on flesh and fat. Some of the heavier breeds are, of course, more prone to making flesh than the lighter ones, especially in close confinement, which is one more reason why a light breed like the White Leghorn is most suitable to the average small poultry-keeper.

CHAPTER IV

HATCHING AND REARING

ALTHOUGH many who read this book will not be in a position to do much hatching and rearing, it is a subject that must be treated at some length. Our contention is that unless one has space and facilities to rear well, it is better to leave it to those who have; and the first elementary rule is that there should be space in which to give the young birds a separate run and sleeping quarters, without interference from older fowls. So long as that is assured they may be reared successfully in comparatively close quarters if they are kept clean and given every requirement; more particularly being protected against overcrowding, which often results from the owner overlooking the fact that his birds are continually growing, and must have more and more space in which to develop.

Natural and Artificial Methods

A choice between the natural and artificial methods of hatching must be dictated chiefly by convenience. A large breeder resorts to incubators because it would be too big a task to look after an army of broody hens, even if he could get them. The incubators may not give him quite such a good hatching percentage, but they do his work on wholesale lines and they save a lot of labour and expense. But the small poultry-keeper who hatches only two or three broods every year may not find enough work to justify the purchase of an incubator, unless he experiences difficulty in obtaining broody hens. And as to that, it should be remembered that an incubator is ready to hatch at any time, whereas sitting hens often have to be waited for. On the other hand, a hen will both hatch and rear her brood, whereas if an incubator is employed it is necessary to have a brooder or foster-mother as well.

Those who keep the lighter breeds that are not often given to brooding must either do their hatching by incubator, or they must buy or borrow broody hens for the purpose. Leghorns and other "non-sitting" breeds do sometimes want to sit, but one can never depend upon them, and they may give the job up after a fortnight. Besides, if one is out specially for egg production one does not want these heavy layers to waste their precious time hatching and rearing chickens. They can readily be broken of broodiness, and the only practical and humane plan to do that is to confine the bird in a coop or a box with a slatted front, giving her food, water, and all necessaries all the time. If she is shut up, within sight of the other birds, for three days and nights, she can be let out on the fourth morning and she will not go back to the nest. The sooner this treatment is started, the sooner she will begin to lay again ; so always be on the look out for broodies, and when you find a hen sticking to the nest in an evening, or coming off and going about clucking, with her neck feathers ruffled, you can be sure that she wants to sit. These remarks apply equally to light and heavy breeds of poultry—in fact to all birds that become broody.

Nests for Sitting Hens

Whether one uses one of one's own birds for sitting, or buys a hen for the purpose, a nest should be made for her in an outhouse—not in the fowl house where other hens are living and laying. A sitting hen must be kept quiet, and in a fairly dark place, so that a well-ventilated shed or outhouse is suitable so long as it is rat-proof. Any sort of box will do for a nest box so long as it is not less than fourteen inches square, but where several hens are set we use a three-compartment orange box, with a four-inch wide strip along the bottom in front to keep the nesting material in. Set the box on a solid, level floor and put a shovelful of soil into each compartment, then scoop out a saucer-shaped nest, with not too steep sides, and line it with soft hay. From twelve to fourteen eggs may be set under a hen, according to her size, but in the early part of the season it is advisable not to give her too many, or some may get chilled.

Setting a Hen

When a broody hen is brought to the nest that has been made for her she should be shut on it with one or two pot eggs or potatoes under her. Put a board in front of the nest, so as to make her secure, but not to exclude air, and she will have settled down within twenty four hours, though a longer period should be allowed before eggs are set under her if she is at all fidgety. Put the eggs under her in the evening, and she will soon shuffle them into position. Once a day during her period of confinement she must be let off for food and water.

Some people leave the nests open so that the hen can come off when she pleases, and when a hen is tame and regular in her habits that plan answers very well. But some hens are uneasy and others sit so close that they will not come off for several days unless they are forcibly removed, so that the safest plan is to lift her off every day, putting the hands under her legs and wings so that no eggs are dragged out. Give her grain, such as maize and wheat, with water, grit and green foods, and let her stay off for ten minutes or a quarter of an hour, during which time she should relieve herself. Make sure that she goes back, and see that she is covering all her eggs properly before she is left for the day. She can be turned loose to feed in the shed ; or a good plan in fine weather is to have a peg driven into the ground, with a cord attached thereto, with a slip-knot at the end to put over the bird's foot, thus tethering her, but giving her a chance to move about for a few yards.

Hatching Time

The hatching period for hens' eggs is twenty-one days, whether under hens or in an incubator. A hen should not be disturbed just about hatching time, and if it is found that her eggs are chipping on the twentieth day it is better to leave her on her nest, though some water may be put within her reach. One can put one's hand underneath her wing from time to time to remove empty shells, but the hen should not be removed from the nest until all the eggs have hatched that are going to hatch. The fresher the eggs the more evenly and promptly they will hatch, whereas some stale eggs that have travelled some distance may take twenty-two or twenty-three days. If any eggs remain unhatched in the nest at the end of twenty-one days their chances of hatching out are very small, but if they are fertile and contain live chicks they may be left for another day under another hen, so that the original mother and the chicks she has hatched need not be detained on the nest.

Testing Eggs for Fertility

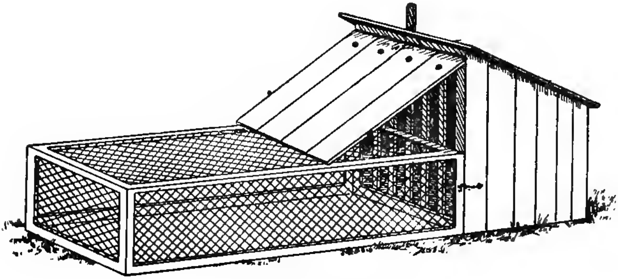
The testing of eggs for fertility should be done about the ninth day of hatching. A simple plan is to have a piece of card-board and cut out a space the shape of an egg, but barely as large. It is better to blacken the card-board, then if an egg is held in the space before a good light, one can ascertain its contents. If it is infertile it will look like a new-laid egg—that is, clear, with the floating yolk just discernible; but if it is fertile and contains a live embryo chicken, one will find a dense and practically solid mass except at the large end, where there will be an air space, with a clearly defined dividing line. An addled egg, in which the partially incubated germ has expired, shows a dark floating mass, and a smaller air space, though not clearly defined. With a strong light one can even detect the red veins of the live embryo, while the eyes of the gradually developing chick are clearly distinguished. If there is any doubt about an egg let it remain for another five days, when its condition will be definitely established. Early testing of eggs is desirable, because if one or two have to be thrown out as clear it makes more room in the nest, and where several hens have been set about the same time it is often possible to make up the full complement from other nests and release one or two hens for another lot of eggs; for a hen, if properly fed and looked after, will set for longer than the regular three weeks—in fact, until she brings off chickens.

Working an Incubator

The successful working of an incubator is largely a matter of practice and experience. The beginner must follow the instructions sent out with each machine, and if his first venture is not successful he must endeavour to find out where he has gone wrong. As a rule, however, one must not expect such good hatching results from an incubator as from a hen, though a good deal depends upon setting newly laid and strongly fertilized eggs. If they are to be put into an incubator they should not be kept more than a week, but if they are to go under a hen they will not be too stale if they are a fortnight old. The best place to work an incubator is a well-ventilated cellar, next to that being an outhouse that is not too cold in winter, while the worst place of all is a living room in which the temperature varies by day and night. There are many makes of incubators, and practically all, except the very cheap ones, are reliable; but it is largely a question of getting to know how to work them to obtain good results.

Rearing under Hens

Having hatched chickens under a hen it is a comparatively simple matter to rear them under her, provided you have the luck to get a bird that is tractable, and it is not a good thing to fuss about with them too much. As soon as the chickens are dry under the hen, about ten hours or more after they are hatched, they can be removed with the hen to a coop, a very simple contrivance measuring about 2 ft. by 2 ft., with a slatted front and a sloping roof to throw off the rain. A boarded floor is desirable, and necessary in the early part of the season, but this should have a covering of litter, such as peat moss about an inch deep. Chickens should never live or run upon bare hard floors, or they are very liable to cramp. They need no food till they are about forty-eight hours old, so at the time of removal from the nest to the coop it is only necessary to give the hen food and water, and then they can be left to settle down. When the chicks venture out to peck about they may be given their first feed, for which there is nothing better than hard-boiled egg, chopped up small, and dusted over with middlings or Sussex ground oats. It is a good plan to get in a supply of Sussex ground oats for the rearing season, since it is the best meal for growing stock. We generally serve food to young chicks on a wooden platter or a square piece of board, so as to avoid leaving



CHICKEN COOP.

any lying about ; for stale, sour food is a fruitful cause of bowel trouble. After a day or two the hard-boiled egg (for which infertile eggs can be saved) may be suspended, and the birds may be given one or two feeds of soft stuff every day, made up of scalded biscuit meal dried off with Sussex ground oats, the other feeds consisting of small chicken corn, commonly known as dry chick food, which can be bought ready mixed from any corn merchant. It is made in two or more sizes, the smallest being for young chicks up to three weeks old, and larger sizes for older birds until they are able to eat the ordinary mixed corn. Young chicks should be fed about every two hours, on the little-at-a-time principle so that they clear up what is given. When they are a fortnight old their soft food should be served in shallow troughs, but their grain should be scattered among some loose litter.

Artificial Rearing

To rear incubator-hatched chicks one can either use a hen, putting the chicks, under her of an evening after she has been sitting for about a week, or one can adopt the artificial plan. If any number of chicks are to be reared it is advisable to invest in a good brooder, heated by a lamp ; but to rear just a few chicks one can often get along very well with a home-made appliance consisting of a well-lined box, with ventilation holes near the top, and a hurricane lamp to supply the heat, or even a good sized hot-water bottle wrapped up in flannel to help to conserve the heat. This, of course, will need refilling night and morning. One should have a temperature of about 85 degrees to rear chickens, but this can gradually be reduced to about 75 degrees. The small brooder should be set inside a house or out-building, but one can obtain outdoor rearers that will stand any weather.

Artificially reared chickens should be fed on practically the same lines and at the same times as those reared under hens. They will learn to pick up without a hen to teach them, and they will soon find their way in and out of their warm chamber, so that after the first week they are less trouble than the hen-reared broods. Coddling is fatal, but they must be kept dry and cosy while they are young.

Distinguishing the Sexes

Whether reared in confinement or on free range, chickens must on no account be run along with older stock until they are big enough to take their own part. The sex of the young males can be determined at about six weeks old in breeds like the Leghorns, which have large single combs, for the springing of the comb is the most reliable indication; but in Wyandottes, which have rose-combs, and in Rhode Island Reds, Orpingtons, Plymouth Rocks and Sussex, which have comparatively small single combs, a beginner may not be able to determine the sex before the birds are three months old. When the cockerels begin to crow, which may be at any time between six weeks and four months, it is time to separate them, and where space is limited the best policy is to kill them for the table. To rear large table fowls, to raise pullets for egg production, and to keep a flock of laying hens, all in a small space, involves some risk of overdoing things. Circumstances often necessitate killing off cockerels when they are quite small, and it is better to sacrifice them than to prejudice the progress of the pullets through overcrowding. Cockerels of small breeds, like Leghorns, never make good table birds, and they are most economical when killed at twelve to fourteen weeks old, while the heavier breeds, such as Wyandottes, Rhode Island Reds, etc., are just about at their best at sixteen to eighteen weeks. To keep them longer one must have plenty of room, and be able to obtain plenty of waste food so as to feed them economically.

Chickens in a Garden

We must remind beginners again that the best pullets for laying are those reared under natural conditions on free range; and the measure of success to be attained in rearing them in town gardens and in small runs depends largely upon what one can do to make their lives and their surroundings as close a resemblance to the natural as possible. One point should be noted, however; chicken coops can be set upon a lawn, and they will do no harm if they are moved a few feet every other day, especially if the coops have wooden bottoms. Moreover, chickens can be allowed to run in a garden till they are two months or more old, either continually or for an hour or two every day, and in this way precious space can be conserved and the birds can be given a better chance to grow. If the space for a poultry run is very limited, and one is anxious to rear chickens, a portion of the vegetable garden may be fenced off for that purpose, and this may be changed from time to time during the season to secure the advantage of fresh ground. By such scheming, or by careful management in a small, closed run, chickens may be reared with fair success ; but we must insist upon the fact that this is an enterprise which beginners should not embark upon when their accommodation and opportunities render it at all risky.

CHAPTER V

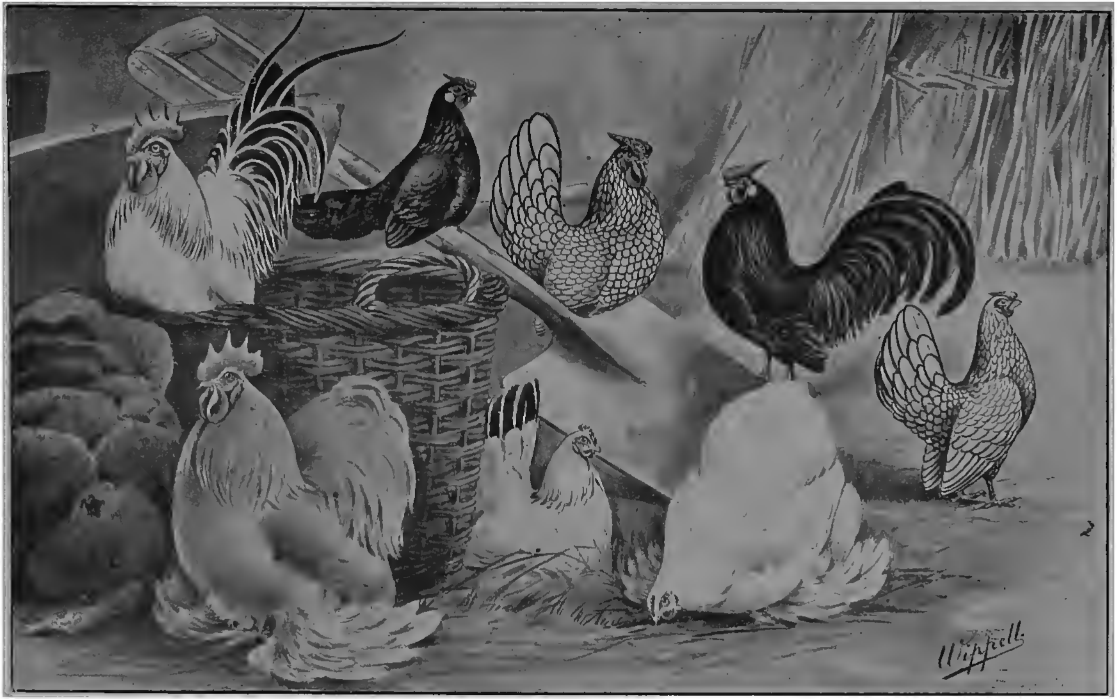
GENERAL HINTS

BANTAMS

ALTHOUGH Bantams are generally regarded as fanciers' fowls, they may serve a useful purpose where the space is too small to keep a few large hens. Half a dozen Bantams can be accommodated in a roosting-box measuring 2 ft. by 2 ft. and 3ft. high, with a scratching-run measuring either 3 ft. by 4 ft. or 6 ft. by 2 ft., for they only need 2 sq. ft. of scratching space per bird. Both house and scratching-run should be built on the same lines, as regards design and ventilation, as recommended for larger fowls; but one great advantage with Bantams is that if they are allowed to run loose in the garden they will do comparatively little harm. Some breeds, such as the Pekin, are unable to scratch because of their profuse foot feathering, but even the clean-legged breeds will do very little harm, and many people let them run out in the garden every day in fine weather.

There are many breeds of Bantams, as fanciers have devoted a good deal of attention to dwarfing the large breeds. Some of the best for egg-production are the Black Rosecombs, which are miniature Black Ham-

BANTAMS.


ROSECOMB HEN.
SEBRIGHT COCK.
ROSECOMB COCK
SEBRIGHT HEN.
JAPANESE COCK.
PEKIN COCK.
JAPANESE HEN.
PEKIN HEN.

burghs, the Black and White Wyandottes, the Buff Rocks, the Old English Game, and the Sebrights. But whichever breed is chosen, the great thing when eggs are required is to obtain a stock of a strain that has been bred for utility rather than for exhibition purposes. This is of special importance with Bantams, because the majority of strains are bred for show purposes, and one of the main points is to get the birds as small as possible, which can only be done by sacrificing laying character. Consequently, anyone who secured stock from a typical exhibition strain of Bantams would probably find the birds very poor layers, whereas if they obtained stock from some one who bred Bantams specially for laying, they would doubtless get plenty of eggs, though the birds would be rather larger than the average show specimens, since the egg-producing organs of a good layer cannot be crowded into a tiny body.

Bantams need to be fed and managed on much the same lines as larger fowls, making allowance for their minuteness. Thus, they do not eat so much food, and their grain should be kibbled. Roughly speaking, a Bantam hen eats only half as much food as an ordinary hen, and if she is allowed the run of a garden she will find a good deal for herself. Like all fowls, she is susceptible to management, and whether or not she lays many eggs in winter depends mainly upon her environment and the manner in which she is fed and managed. Bantam eggs are small but nourishing, and they are specially favoured by invalids and children. On account of their size it is not possible to specify their market value ; and we prefer to regard the keeping of Bantams as a hobby for the production of eggs for the home rather than as a commercial proposition.

DUCKS

Of late years duck-keeping for egg-production has come more and more into prominence, and there can be no doubt that the modern duck of laying type is the most prolific and economical producer of domestic eggs. She is at her best, however, when she has free range on a farm or a common, and she is at a disadvantage when she is kept in a small run, although many people do attempt to keep laying ducks in small yards, sometimes with very satisfactory results. The modern laying duck, however, is a very active creature, and under favourable conditions she wanders far afield and finds a lot of natural food, all of which would have to be given her in confinement, so that there is a great saving in being able to run ducks at liberty, besides the birds keeping in better productive condition. Activity promotes health, and when ducks are kept in small runs there is no means of promoting exercise as we do by encouraging hens to scratch. Scratching-sheds are of no use to ducks, and on that account the costs of housing are much reduced, though at the same time we lose efficiency and we cannot expect such a good egg yield.

Best Breeds for Laying

The best ducks for egg production are the Indian Runner, the Khaki-Campbell and the Buff Orpington. The first-named is the most popular, and is the typical egg-producing duck—very active, light framed and prolific, but of inferior quality for the table, just as the egg-producing White Leghorn is among fowls. The

Buff Orpington is rather better in this respect, and it is more in the nature of a cross between the small laying breeds and the heavier table class of ducks. When egg production is the sole purpose in view, one is more likely to secure prolific stock in Indian Runners than in any other breed, for the reason that it is bred almost entirely for its laying properties. If free range is available it is only necessary to have a small, well-ventilated house or shed for sleeping quarters, with a small yard fenced off with 2-ft. wire netting, in which the ducks should be kept confined until about 9 a.m. by which time they will have laid their eggs. If they are let out first thing in the morning they are liable to drop their eggs anywhere about the fields, and many of these may be lost. The house should allow about 2 sq. ft. of floor space per bird, so that for a dozen ducks a house measuring 6 ft. by 4 ft. will be large enough. It should have a wooden or concrete floor, and plenty of clean, dry bedding, for ducks are not lovers of filth, and it is practically impossible to get eggs from them in winter unless their sleeping quarters are dry and comfortable. Ventilation is also important, and houses should be fitted with sliding shutters in front; or an open-fronted shed facing south can be converted into a useful duck-house by nailing a sheet of corrugated iron, or boards, 2 ft. high, along the front, with wire netting above, and a weather-board sloping from the eaves to prevent rain from beating in.

Feeding Ducks for Egg Production

The feeding of laying ducks that are running on free range is a simple matter. First thing in the morning, before they are let out of their yard, they may have a feed either of mash or of grain—it matters little which—since ducks do not scratch. The mash is made up just about the same as for hens, utilizing house scraps and vegetable matter as much as possible; and if the ducks are confined we should include the fish meal or other substitute for meat, whereas ducks running at liberty will find all the insect and other animal food needed. If grain is given an ordinary mixture of wheat, oats and kibbled maize will do, and it is a good plan to give this in troughs of water. After that ducks on free range will require nothing more until they come back for the evening meal, for which either grain or mash may be given, according to what they had in the morning. If the morning feed was mash then the evening should be of grain, and vice versa. At some periods of the year when worms and slugs are abundant, the ducks will need very little in the evening; but they are regular in their habits, and if a meal is ready for them at a certain time they will come back ready for it, even though they eat only a little. Of course, ducks must always have plenty of drinking-water, but swimming-water is a secondary consideration for birds of the laying type. They will make use of a pond or a stream when on full range, but they will not suffer for lack of it; when kept in confinement a shallow bath may be let into the ground and kept filled with water, just for the birds to wash in, but even this is an extra that is not absolutely essential, the main consideration being a regular supply of fresh water served in troughs which the ducks cannot foul by getting into them.

Ducks in the Garden

There is one important consideration for the amateur gardener. Ducks of the Indian Runner class are valuable allies in the spring when slugs and other pests are abundant, and if they have plenty of green food at ordinary times they will not do much damage to growing crops; moreover, they do not scratch, like hens, and when they are kept in small runs it is a double advantage to turn them into the vegetable garden of an evening. We have known them to clear a garden that was infested with slugs, and beyond pulling a few lettuce leaves they did no damage whatever. At digging time, too, they will follow the spade and gobble up the worms; and altogether ducks of this class may be regarded as the most useful gardening allies among feathered stock.

Ducks that are kept in confinement naturally require more food than those on free range, and especially they need such essential ingredients as green food and meat substitute, in the form of fish meal. Green stuff should be given in generous measure, and all sorts of waste vegetable matter can be boiled up for mixing with the mash. It is advisable to give confined ducks an extra feed at midday, and this may consist of mash where plenty of waste food is available, though when it is necessary to save trouble, grain will be found most suitable. A small run for ducks should not be allowed to degenerate into a mud-bank, as it will in wet weather unless it is properly constructed. The best plan is to build it up above the surrounding ground, first with large stones or coarse rubble, and then with gravel, which will ensure good drainage and the washing away of impurities. Grit and shell-forming material must be given to ducks as well as to hens.

When to Hatch Ducks

The eggs produced by Indian Runners are as mild-flavoured as hens' eggs, and do not possess the strong flavour of eggs laid by some of the larger breeds of ducks. Under favourable conditions Runners will lay up to 250 or 260 eggs in a year, and it is not unusual to obtain an average of 200 eggs per bird in a year from a flock of a dozen. Moreover, they will lay almost as many eggs in their second season as in their first, and if they lay well in their first year they are always worth keeping for two seasons. They should be hatched at the end of March, or up to mid-April, then they will be likely to commence laying early in October, and under favourable conditions they should lay through the winter, though they are more affected by snow and severe cold than hens because they are not able to keep themselves warm by indulging in scratching exercise.

Ducklings for the Table

The raising of ducklings for the table can be undertaken in a very limited space, for in this case close confinement is essential, the object being to get the birds as large and as fleshy as possible in a short time, before they begin to grow the adult plumage, which is generally about the age of eleven or twelve weeks. Ducklings should therefore be killed for the table when they are nine or ten weeks old, by which time they should run to upwards of 4 lb. apiece, so rapidly do they grow under favourable conditions. The best breeds for this purpose are the Aylesbury and the Pekin, the former for preference, and it must be understood that these are not good layers like the Indian Runner. There is no necessity to keep breeding stock, for anyone who desires to raise a few ducklings for the table can purchase eggs for hatching at any time between February and June. The earlier ducklings are hatched the better prices they will fetch in the market, but when they are raised for home consumption that need not be considered. A good-sized hen will cover a dozen duck eggs, which take four weeks to hatch, and the hen will rear the ducklings in an ordinary coop. Ducklings are more hardy than chickens, and as a rule they can leave the hen when about three weeks old, when they can be moved to a small cosy house with a dry floor and a small yard adjoining. This will serve them throughout their short lives ; so, as they grow quietly the house must be large enough to accommodate them when they attain the maximum size. Two square feet of floor space per bird should be allowed, and the outer yard need only be just large enough for the birds to walk round, for exercise is undesirable, and swimming water should not be allowed.

Feeding Table Ducklings

Young ducklings can be fed for the first two or three days on hard-boiled egg and scalded oatmeal. Then they can be put on to a diet of mash made up of scalded biscuit meal or Uveco dried off with middlings or Sussex ground oats ; when they are about three weeks old they can be put on to a regular diet, consisting of scalded house scraps and boiled potatoes, mixed with middlings, maize meal and Sussex ground oats. We do not lay down any definite rules as to ingredients, because we have always used whatever was most convenient; but where potatoes and scraps are plentiful, maize meal and

A TYPICAL AYLESBURY DUCK.

middlings in equal parts will be economical for drying off. If skim-milk or buttermilk can be obtained it will be a valuable addition to the mash, and a supply of meat, such as boiled butchers' offal, is a great help in promoting rapid growth. There is no need to give any grain to ducklings intended for the table, though many people like to give one feed last thing in the evening. The great thing is to maintain a regular succession of meals ; and up to the age of three weeks it is advisable to feed every two hours, after which four times a day will be enough. All food must be given in troughs, and the purpose should be to get the birds to eat as much as they can. Therefore, all mash should be mixed into a fairly soft, sloppy consistency, and potatoes and scraps should be crushed so that there are no large pieces. Fill the troughs at feeding time, let the birds eat as much as they will, then remove all that remains, leaving them to rest until the next meal is ready. Give plenty of water for drinking, also green food and grit, and keep the birds clean, then they will be ready for killing at nine or ten weeks. If they are kept any longer the adult plumage will begin to grow, and for six or seven weeks they will do nothing but make feather growth, losing body condition all the time, so that to get them into good form again it will be necessary to undertake another month's heavy feeding, and then they will not weigh much more than they did at ten weeks. Thus it will be seen that early killing of table ducklings is an economical necessity, since you will get practically nothing more by feeding for twenty weeks than you will in nine or ten. The easiest way to kill ducklings is to stun them first and then to sever the neck artery with a sharp knife. They are easily plucked before the pin feathers begin to grow, as they are covered only with downy feathers.

PRESERVING EGGS

In order to make sure of a supply of eggs at all times of the year it is good policy to preserve a quantity when they are plentiful in the spring, for use when they are scarce and dear in autumn and winter. There are several methods of preserving, but the simplest and best is by means of water-glass, technically known as silicate of soda. This can be bought from any chemist in tins containing one or more pounds, costing about 6d. per lb., and as a pound of silicate has to be dissolved with nine pints of water it will be seen that a large number of eggs can be preserved at a low cost. The plan of procedure is to boil the water, and so dissolve the silicate. The tin will have to be swilled out with boiling water to get out all the silicate, and then the solution must be stirred for some minutes until it is well mixed, after which it should stand to cool. It is then ready for use, and if it is found that new-laid eggs float in it it is a sign that the solution is too strong, and another pint or two of boiling water should be added and stirred in. However, a pound of silicate to nine pints of water will generally give the right consistency.

Methods of Preservation

One of the most important points is the selection of the eggs for preservation. They must, above all, be quite fresh, and if they come from hens that are not running with a male so much the better. In any case, eggs intended for preserving ought to be collected soon after they are laid, allowed to cool, and then put into the preservative. They must be quite clean, and the shells must be of good thickness, or they may be broken. There is always some risk of buying eggs for preserving, as they may not be quite fresh, and one bad egg in a batch will spoil the flavour of the whole lot. Earthenware or enamel vessels are the best for preserving eggs, and where one is preserving one's own, and only a few are produced every day, the vessel can be filled by degrees, adding water-glass occasionally so as to keep all the eggs well covered, until the vessel is full. Let there be two or three inches of solution covering the top layer of eggs, then cover up the vessel to keep it air-tight, and store it in the cellar or in the coolest place available. It is advisable to examine the contents once or twice during the summer to make sure that the solution has not evaporated and that eggs are not exposed. To prevent any floating it is a good plan to lay a plate, inverted, upon the top layer. When the eggs are taken out of preservative, it is a good plan to prick the shell at the large end if they are to be boiled, to prevent cracking. They can be used at any time up to ten or twelve months, and if they have been well preserved they will come out practically as fresh as when they went in, and without any flavour.

COLLECTING AND MARKETING EGGS

An egg deteriorates the longer it is kept, for the contents evaporate; and examination of an egg under a strong light at a week, a fortnight, three weeks and a month old, will reveal a constantly growing air space at the large end. This evaporation renders the egg stale, but it does not cause putrefaction. That can only occur when there is some decomposing matter in the egg, such as a partly incubated germ. In spring and summer, when broody hens abound, an egg may be laid in the morning, and it may be sat upon all day in the nest before it is collected in the evening, so that if the hen that laid it has been running with a male the germ may be partially incubated, and if the egg is afterwards kept for some time decomposition may set in. On that account it is important that eggs should be collected two or three times a day, especially if they are fertile. Nests should be kept clean, with plenty of fresh litter, for it spoils the bloom of an egg if it has to be washed.

Storing

If eggs are to be stored for sale or for any other purpose a system should be adopted so that no eggs are kept longer than a week. There is no necessity to mark the eggs unless one likes to do so, but they should be stored in a tray or drawer, in a cool room, so that one takes them away from the opposite end at which one puts them in. Those who produce more eggs than they require for their own use must look out for opportunities to market them satisfactorily. Usually a small poultry-keeper can find customers among his own friends and neighbours, especially if he sells at a little less than the shops, though many people are prepared to pay more for eggs direct from the nests, a fact that is worth bearing in mind when one is looking out for buyers. The shop egg has rather a bad character, and that gives an enterprising poultry-keeper a chance to cater for the more particular class of consumer by paying attention to freshness and cleanliness. Contrary to popular belief, there is no difference between the contents of a brown egg and a white one. It is just a matter of pigment in the shell. But quite apart from the colour, the richness of eggs varies according to the foods on which the birds are fed. Pale yolks generally suggest lack of green food, which supplies mineral salts to the system. Colour of shell is really a minor consideration, but the great points in selecting eggs for sale are freshness, cleanliness and evenness of size. A 2-oz. egg is the average market size, but the average runs smaller in autumn, when pullets are beginning to lay. Do not spoil a sample by putting one or two small eggs in with a lot of good-sized ones, but sell the small eggs separately at a reduced price.

Pullets' Eggs

When a pullet commences to lay her eggs are small, sometimes less than 1½ oz., but by degrees they improve, until in a month or six weeks she should be laying 2-oz. eggs. Pullets that commence laying precociously, say at five months, before they are properly matured, will probably lay small eggs all their lives, and such birds should not be bred from on that account. Breeding for prolificacy has led to some deterioration in size of egg, and there are some strains that fail badly in this respect. To steer clear of these, or to make good the defect by systematic breeding among layers of large or good-sized eggs, is one of the problems the modern poultry-keeper has to cope with.

Crowing Cocks

A common cause of objection to the keeping of poultry in urban areas is the crowing of the cocks. That cause is also easily removable in most cases, because the majority of town poultry-keepers have not sufficient space to engage in breeding operations, so there is no necessity to keep a male. The householder who keeps a few hens to supply eggs for his home, and to sell a few to friends, need not trouble himself to run a cock with his flock, for the male has no influence upon production, and his sole function is to fertilize eggs for hatching. Anyone who is interested in "breeding," and has room in which to engage in it, can minimize the annoyance to neighbours by keeping the male only during the actual breeding season and getting rid of him when no more fertile eggs are required. Young cockerels should also be disposed of when they become noisy. There is no effectual means of preventing a cock from crowing. A low roof will not do it, as he will learn to avoid it. The best plan when possible is to eliminate the male altogether.

CHAPTER VI

A FEW AILMENTS AND OBSTACLES

It is not our intention to deal at length with the subject of diseases, and one reason is because we have described how hens can be kept in good health and profit, and only bad management or sheer bad luck is likely to bring the amateur into contact with what we may call the more serious diseases of poultry. The kind of bad luck that does sometimes come the way of a beginner is when he lets his desire for a " bargain " get the better of his judgment, and he purchases what appear to him to be very cheap birds. As a matter of fact, they are probably too cheap to be genuine, and in such a case he may get hold of a bird or birds carrying the germs of disease, which, if it gets a hold, may result in the decimation of his entire flock. That is a good and sufficient reason for avoiding cheap birds, and for having dealings with a breeder you know, either personally or by repute. Apart from that cause, you may keep poultry for fifty years, and never have an experience of actual disease; but when anything happens which you do not understand, and which you think may be serious, be sure to isolate the bird and consult some one who understands such cases. If a bird dies, send it to an expert for post-mortem examination. It may be a sudden death, such as apoplexy, due to too generous feeding ; or it may be some trouble with the productive organs, which you cannot very well avoid ; but on the other hand, it might be some organic disease, and in that case you need to know what is wrong, and what you ought to do to cope with it.

Causes of Disease

There is a cause for every disease and ailment, and as many of them can be avoided by taking reasonable precautions we think we can best assist the beginner by giving him some idea of the conditions which are likely to land him in trouble, and which, therefore, should be avoided. For example, colds may be caused by draughty houses, but they are also due to birds being closely confined at night in stuffy, unventilated sleeping quarters. We have already stated the importance of providing ample ventilation, but we must avoid draughts as far as possible, and for that reason we prefer houses that are deep in proportion to their length—that is, deep from front to back. Some houses are built too shallow, say 8 ft. long and 4 ft. from front to back, with the result that when the shutters are open draughts sweep through them. The deeper the house the better one is able to protect the birds from draughts while on the perches, but in some cases it will be found that a few ventilation holes at the back of the house, just under the eaves, will assist matters by promoting a steady current of air, without draughts.

Colds

When a bird is seen to be snuffling, coughing, or making a rattling noise in the throat, it is always advisable to isolate it. A simple remedy is fifteen drops of sweet nitre in a tablespoonful of warm water, given morning and evening, while a few grains of permanganate of potash, sufficient to colour the water, should be given in the drinking water for all the birds, to prevent the complaint spreading. But the great thing is to discover the cause and to deal with it; while it is important to deal with a cold in the early stages, for if neglected it is liable to develop into roup and diphtheria, two diseases that carry off thousands of fowls, chiefly owing to neglect on the part of their owners.

Diseases of the Digestive Organs

Digestive troubles, such as diarrhœa, liver complaint, etc., are generally traceable to wrong feeding, or to lack of exercise or unsanitary surroundings. The natural, active life is the best for a hen, and we have shown how a very good imitation of the active life can be lived in a well-designed scratching shed. Never give sour food of any description, such as musty grain or meal, putrid meat or stale green food. In the case of diarrhœa, where the droppings are loose, a teaspoonful of olive oil will allay irritation, and boiled rice is a good food to stop scouring. Fowls are very fond of charcoal, and if a supply of this is always kept before the birds it is an effective preventive of diarrhœa.

Crop Troubles

There are two forms of the trouble known as crop-bound. When you see a bird refusing her food, and with a bulging crop, you may be sure she is suffering from one or the other form, and it is up to you to find out. Catch her at once, and if her crop is hard, and obviously full of food, you may take it that the trouble is due to some obstruction preventing the food from passing into the gizzard. It may be a ball of dry, tough grass, or a bone, or a stone; but in any case, your best chance of removing it is to knead the crop for five minutes, then let the bird rest. In three hours' time examine her again, and if there is no change repeat the kneading, and give a few teaspoonfuls of warm milk. Continue this as long as may be necessary, and if the treatment fails there is no means of saving the bird's life except by an operation, which should be done by an experienced person, since it entails opening the crop, cleaning it out and sewing it up again. But before resorting to this be sure to give the milk and kneading remedy every chance.

The other form of crop trouble is often known as slack crop, and in this case the crop appears to be full of soft or watery matter, which is due to inflammation of the lining membrane, probably as the result of the crop becoming excessively distended. The thing is to get rid of the contents, and as a rule the best plan is to evacuate them through the mouth. A teaspoonful of glycerine should be given first, then gently knead the crop, lower the bird's head, and some of the sour-smelling matter will run out. Give the bird time to breathe, but continue evacuating the contents till you get the crop fairly clear. Then give a little more glycerine, with one drop of disinfectant in it, and let the bird rest. Afterwards let her have nothing but bread and milk for several days until the crop resumes its normal condition. Milk is one of the most useful remedies in a case of crop trouble.

Affections of the Limbs

Cramp and rheumatism are generally due to wet ground or to bare floors. One seldom experiences these troubles in a well-built, well-littered scratching shed, and when a hen does get cramp in these circumstances it is a sure sign that she is of poor physical character, and not worth bothering about. Let us point out here that every hen is not physically perfect; and those that fail in that respect are not worth hospital treatment. We do not care to make too much of the sentimental side of poultry-keeping. To us a hen is a potential source of profit, therefore she must be healthy and physically fit. If she is not she is of no use to us, and we have no interest in doctoring and nursing her to keep her alive. In rearing chickens and in keeping laying stock, the rule about the survival of the fittest must hold good; and the amateur who is starting with poultry need not imagine he must equip a hospital for ailing birds. An isolation shed is necessary, but any bird that needs continual doctoring is of no use to him, and the sooner its career is ended the better, both from a monetary and hygienic standpoint.

Feather-Plucking

When fowls are kept in close confinement, especially when they are fed on rich and heating foods, and there is not a sufficiency of green food, they sometimes take to plucking and eating feathers. What they need is something to cool the blood; so eliminate the rich and heating elements from the diet, and give plenty of vegetable food, both green and cooked. Give them plenty of scratching exercise, and let them have a turnip to peck at occasionally and a heap of loose mould to dust in.

A small piece of sulphur in the drinking water will also help matters.

Scaly Leg

Rough scaly legs are not exactly a sign of ill-health, but they are due to minute parasites burrowing among the scales of the shanks, and eventually it may cause lameness. As soon as the legs are seen to be becoming rough they should be washed and scrubbed, and when dry the shanks should be smeared with a mixture of paraffin and sulphur, which will check the spread of the scale. In bad cases some weeks must elapse before the unsightly scaly matter peels off and the shanks resume their normal appearance. A half-yearly dressing with paraffin and sulphur will generally prevent this trouble.

Crooked Breasts

Crooked breasts are generally attributed to birds being allowed to perch when very young, before their bones are set hard. That may be a direct cause in some cases, but it is a fact that birds develop crooked breasts without perching, so that it must be regarded as a constitutional defect. The best way to avoid it is to breed from vigorous matured stock, and to prevent young birds from perching until they are about four months old, when well-rounded perches about two inches wide should be provided.

Insect and other Pests

There are three distinct classes of insect pests that give trouble to poultry keepers, and they have different habits. Lice are the light-coloured creatures that live entirely upon the birds, and these are more prevalent in runs that are not kept clean, and in which no dust bath is provided. Under natural conditions birds will keep themselves free from lice by frequent dusting, so be sure they have a dust bath in their run, and if you find any lice upon them sprinkle some insect powder among their feathers. Fleas infest the nest boxes when they are not feeding upon the birds. Therefore never let hay or similar material remain long in the nest boxes. In summer clean it out once a month and burn it. The nest boxes should be dressed with creosote preservative once a year, and insect powder should be sprinkled in the nests. Hen fleas and lice will not live upon the human body, though they may cause some irritation for an hour or two. Perhaps the most dangerous of the pests are red mites which are not insects but spider-like creatures so small that they are scarcely seen by many poultry-keepers. They lurk among the perch sockets and cracks of the woodwork during the day, and feed upon the birds at night, and their presence can be detected by a whitish scaly substance in the perch sockets and other haunts. The most effective remedy is to spray or pour creosote preservative into the sockets and all cracks and crannies.

Moulting

Moulting is a natural process, consisting of the casting off of the old feathers and the growing of the new ones. A hen moults at the end of the summer or in the early autumn, having completed her laying season, and it is the exhaustion of her energy that leads her to moult.

Consequently, if one wants birds to moult early one has only to put them on a low diet ; and, in the same way, to postpone moulting as long as possible one gives stimulating food to encourage laying. Some birds moult gradually, dropping a few feathers at a time so that it is scarcely perceptible, and such birds may lay while the moult is proceeding ; but others drop their feathers altogether and become practically bare. This form of moult is a severe shock to the system, and entails a great strain, therefore a bird needs to be adequately protected and well fed. The moult may take from a month to three months, according to the bird's condition and other circumstances, and while the new feather growth is proceeding it is important to feed generously, and to give a little food of an oily nature, such as sunflower seed, hempseed or linseed. Pullets that are hatched early in spring, and begin to lay in summer, are liable to fall into a partial moult in the autumn, which will mean four to six weeks' cessation from egg production.

Egg-Bound

Sometimes, through becoming over-fat through rich food and lack of exercise, or through trying to pass an abnormally large egg, a hen will become egg-bound. She will visit the nest frequently, or stay on it for a long time, standing up and straining to try to pass the egg. If she comes off the nest she will walk about in obvious pain, waddling like a duck, with her abdomen nearly touching the ground. When it comes to this stage she must be in a bad way, and relief must be afforded. Give her first of all a dessertspoonful of castor oil, which will clear the bowels, and a little later pass an oiled finger up the vent to see if you can touch the egg. Sometimes by moving it one can give the hen relief. If not, procure a rectal syringe and inject a little warm glycerine into the passage of the oviduct, which is above the rectal exit. Another plan is to hold the bird's vent and abdomen in the steam from a boiling kettle, taking care not to scald her, as this has the effect of relaxing the muscles. Avoid breaking the egg unless you can get it close to the vent, so that every morsel of shell can be got out without lacerating the oviduct. A broken egg in the oviduct will often cause peritonitis.

Egg-Eating

When hens take to eating their eggs it is generally through eggs getting broken in the nests. So give plenty of oyster-shell, or lime in some other form, to ensure strong shells, and let the nests be well lined with hay. If the vice becomes chronic, remove the contents of an egg, fill it with mustard and cayenne pepper, seal it up and put it back in the nest. One or two such experiences will generally cure a beginner at egg-eating, but when a hen has got the vice badly it is a case of either wringing her neck, or installing nests in which the egg when laid will roll down and fall into a chamber below where the hen cannot see it. There are few things more annoying and more wasteful than egg-eating, and every precaution should be taken to prevent it.

Egg Defects

There are several minor defects connected with egg-laying, and there are several more serious affections of the ovarian organs which cannot be prevented in the best-regulated establishments. Small eggs are generally produced by pullets commencing to lay, or a small, yolkless egg may be laid by a hen at the end of a batch. Large double-yolked eggs are due to the active condition of the ovary, which releases two yolks closely following one another, so that they come together in the oviduct and are coated with albumen and shell. This is due to giving too much forcing or stimulating food, and the remedy is obvious.

Sometimes on eating a boiled new-laid egg one comes across a spot of dark matter, something like cooked liver. It is a small clot of blood, due to slight rupture of one of the tiny bloodvessels in the ovary. It may not occur again, but if it does the probability is that the birds are having spice containing some irritant. Add a drachm of tincture of iron to each quart of drinking water. The egg is quite good to eat if the clot is removed. Thin-shelled eggs are generally due to lack of lime in the system, and plenty of oyster-shell must be given. But an egg that has no shell whatever, beyond a tough skin, is usually the second egg laid by the same bird on the same day. This is another result of forcing or stimulating food, and when hens are in full lay, and having good food, they will often lay a normal egg in the day, and drop a shell-less egg from the perch at night, which is sheer wasted effort. Pale-yolked eggs are due to anæmic condition, caused by lack of green food. Malformed eggs are generally caused through hens being too fat; and various other egg defects can be traced to some irregularity in feeding and management.

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